VOL. 1., PART 5. [MAY, 1914.

Registered at the General Post Office for Transmission by Post as a Newspaper.]

THE QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

NEW SERIES.

VOL. I. PART 5.

MAY.

By Authority:
BRISBANE: ANTHONY JAMES CUMMING, GOVERNMENT PRINTER
1914.

CONTENTS.

		PAGE.
AGRICULTURE—		
Agricultural Lime and Limestone in Queensland	J. C. Brünnich	299
Application of Lime to the Soil in the South Burnett District		304
Onion-growing in the South Burnett District	G. B. Brooks	305
The Relation of Cotton-buying to Cotton-growing		309
Clearing Land by Machinery		313
The World's Production of Cotton: Threatened Sources of Sea Island Variety		315
Cotton from Australia		316
A New Potato Digger		316
Teff Grass		317
Experimental Feeding of Stock on Zamia Leaves		317
Victorian Beet Industry		318
THE AMERICAN BEEF TRUST		319
DAIRYING—		
The Dairy Herd, Queensland Agricultural College, Gatton		320
POULTRY—		
Report on Egg-laying Competition—Q. A. College, March, 1914		321
General Report on Egg-laying Competition—Q. A. College, 1913-14		321
STATE FARMS—		
Roma State Farm		324
Notes from Kamerunga State Nursery	C. E. Wood	325
Warren State Farm		326
A PERFECT FERTILISER		327
THE ORCHARD—		
Fruit Culture in the Burnett, Gympie, and Maroochy Districts		328
Twin Pineapples		332
TROPICAL INDUSTRIES—		
Notes on Date-growing—IV.		333
Cotton at Gossypium Park, Cairns District	H. Newport	340
A New Egyptian Cotton Plant		343
Ramie		343
TIMES OF SUNRISE AND SUNSET AT BRISBANE, 1914		344
VEGETABLE PATHOLOGY—		
A Gumming Disease Affecting Lemon Fruits	E. Jarvis	345
HIGH-PRICED BEEF		348

PAGE.

SCIENCE—
The Prevention of Malaria 349

THE ALGAROBA OR MESQUIT BEAN (*Prosopis Juliflora*) 351

GENERAL NOTES—
Horse Winch 352
The Indestructible Tyre 353
Remarkable Growth of Pineapples 354
Coconuts, the Consols of the East 355

ANSWERS TO CORRESPONDENTS—
Ripe-rot Disease of Bananas 356
Sauerkraut and Canning Vegetables—Pineapple Wine 356
Waterproofing Coats, &c. 357
Poisoning Trees 357
Sheep on the Coast 357

STATISTICS—
Rainfall in the Agricultural Districts 359

THE MARKETS—
Prices of Farm Produce in the Brisbane Markets for April, 1914 ... 360
Southern Fruit Markets 360
Prices of Fruit—Turbot-street Markets 361
Top Prices, Enoggera Yards, March, 1914 361

FARM AND GARDEN NOTES FOR JUNE 362

ORCHARD NOTES FOR JUNE 364

LIST OF AGRICULTURAL AND HORTICULTURAL SOCIETIES ... ... I.

DEPARTMENTAL ANNOUNCEMENTS ... ... VI.

NOTICE.

Queensland Agricultural Journal.

It is hereby notified that the *Journal* will be supplied to all members of Agricultural and Horticultural Societies who do not derive their livelihood solely from the land, on payment, in advance, of an annual subscription of 5s., which will include postage. Schools of Arts will be supplied at the same rate.

Persons resident in Queensland whose main source of income is from Agricultural, Pastoral, or Horticultural pursuits, which fact should be stated on the attached Order Form, will receive the *Journal* free

ON PRE-PAYMENT OF 1s. PER ANNUM,

to cover postage.

To all other persons the annual subscription will be 10s., which will include postage.

All remittances should be made by postal notes or money orders, but where they are unobtainable stamps will be accepted, though the Department accepts no responsibility for any loss due to the latter mode of remittance.

For your convenience an Order Form is attached. A cross on each side of the Order Form indicates to the recipient that his subscription is again due.

Amount of one year's subscription should therefore be forwarded with Order Form, without delay, to the UNDER SECRETARY, Department of Agriculture and Stock, Brisbane.

All subscriptions received for the *Journal* after the seventh day of the month will commence with the month after that on which payment is received. Previous copies available will be supplied at 6d. per copy.

ORDER FORM.

Date.....

To the Under Secretary, Department of Agriculture and Stock, Brisbane.

*For the enclosed** ..... *please forward me THE QUEENSLAND AGRICULTURAL JOURNAL for One Year.*

Name.....

PLEASE WRITE PLAINLY. *Address*.....

.....

Occupation.....

Subscribers who wish to obtain the Journal for the current month must apply before the 15th of that month.

* State amount according to above rate.

QUEENSLAND AGRICULTURAL JOURNAL

VOL. I. MAY, 1914. PART 5.

Agriculture.

AGRICULTURAL LIME AND LIMESTONE IN QUEENSLAND.

BY J. C. BRÜNNICH, Agricultural Chemist.

The use of lime in agriculture is so ancient and so well known that it hardly appears necessary to write any more about it. A good deal of misunderstanding, however, still exists, more particularly with regard to the use of various forms of lime; and a few notes on the action of these may be welcome to a few.

All practical farmers know, or should know, that, unless their soil contains a sufficient amount of lime, the plant will not be able to derive full benefits from an application of natural or artificial fertilisers, and large amounts of artificial fertilisers have gone completely to waste by overlooking this fact. Although it is now recognised that lime in itself is a necessary plant food, it must not be considered a fertiliser in the ordinary sense of the word, as its chief value lies in the fact that it has a powerful action in improving the quality of soils in various ways.

Liming improves the texture of the soil, increasing, on the one hand, the porosity and tilth of heavy clayey soils, and, on the other hand, helps to bind loose sandy soils, giving them a more loamy character and making them more retentive. Lime counteracts any excess of acidity, and also precipitates and destroys ill-effects of certain soluble iron salts. It again liberates valuable mineral plant foods, chiefly potash, and helps in the decomposition of organic matter, in aiding the activity of various kinds

of bacteria, more particularly the valuable bacteria of nitrification, which change ammonia salts into nitrates, and in making the nitrogen available to plant life.

Lime may be applied in various forms, in accordance with the nature and requirements of the soil. The principal forms are—

1. Caustic lime, burnt lime or quick lime, and air-slacked lime.
2. Carbonate of lime, marble, limestone, chalk (shells, coral).
3. Sulphate of lime or gypsum.

Burnt lime or **quick lime,** is obtained by the burning of limestone (carbonate of lime); it has a powerful caustic action, and is of particular value to heavy clayey soils and soils containing large amounts of organic matter, like peaty and swampy soils; it is also useful to be applied after ploughing under a heavy crop of green manure. It is generally applied at the rate of 10 cwt. to 1 ton per acre, and every three, five, or more years according to nature of the soil. Caustic lime may be applied as such in finely ground form, but it is more frequently used in the slightly milder form of slaked or air-slaked lime. Caustic lime absorbs moisture eagerly, evolving a considerable amount of heat, changing into slaked lime. The burnt lime may be simply left in heaps on the field, allowing it to crumble gradually into powder form, or the process may be hastened by sprinkling the heaps with a little water. As soon as all the lime has fallen into powder it is broadcasted over the field. As lime has a tendency to sink readily into the soil by the solvent action of water, it is not ploughed in, but may be slightly harrowed in. Quick lime is generally applied by itself a few weeks before giving a dressing of artificial fertilisers, because if applied with superphosphates it would change the soluble phosphate into an insoluble form, and if applied with ammonia salts, like sulphate of ammonia, it would liberate and drive off ammonia.

Carbonate of lime is generally applied in form of limestone screenings, crushed coral, and shell sand, and is chiefly used for lighter soils. Its action is very much slower, and, as it contains generally only about 50 per cent. of lime, it must be applied in much larger amounts than quick lime. As a rule, from 1 to 2 tons of limestone will have to be applied per acre. The action of limestone is, in many cases, very much improved by applying at the same time a small amount of air-slacked lime, say from 3 to 5 cwt. per acre, on account of the immediate stimulating action of this more soluble form on bacterial life.

Sulphate of lime, or gypsum, is often used as a top dressing for clover, lucerne, and other leguminous crops. Its chief value lies in its use for soils containing alkali carbonates, and infertile "alkali patches" may be often improved by a heavy dressing of gypsum or "plaster."

It is generally considered that a soil with less than 1 per cent. of lime is deficient, and requires liming. A very great percentage of our Queensland soils contain much less than 1 per cent., and we generally consider an amount of ½ per cent. as fair.

There can be no doubt that the great bulk of our agricultural lands would be greatly benefited by liming. In a few isolated cases we have reports on the effect of liming, and in all cases where sufficient lime was applied the results were excellent; therefore, we can strongly recommend our farmers to use lime in one form or another, according to the requirements of their soils.

From the "Queensland Mineral Index and Guide," by the Government Geologist, Mr. B. Dunstan, we find that limestone deposits are very widely distributed in Queensland, and the average annual yield (of five years, 1908-1912) was 129,000 tons, principally used as a flux in smelting operations, and the principal districts supplying limestones are:—Charters Towers, Chillagoe, Etheridge, Gladstone, Herberton, Cloncurry, Rockhampton, Stanthorpe, Star River, Warwick, &c.

In order to get some information on limestone deposits in this State, the various inspectors attached to the Department of Agriculture and Stock were asked to report on limestone deposits in their districts, and submit samples for analysis. Good deposits of pure limestone exist in various localities. The cheapest source at present is the limestone quarry at Marmor, which supplies limestone screenings at 6s. per ton loose in trucks, and at 10s. per ton in bags. At this price the limestone can stand to be carried a good distance by rail, and still be cheap enough to be used by the farmers. Burnt lime of high quality is obtainable from Calcium Siding, on the Charters Towers Line, at £2 per ton. Shell lime is collected in many places on the coast, but the cost, as a rule, is too high.

Interesting deposits of "calcareous sinter" exist in various localities on the Darling Downs, at various depths, underlying alluvial soil. Similar deposits are found near Springsure, and also near Mirani, in the Mackay district. These deposits are most probably due to the action of underground water on calcareous rocks, the solution is then drawn by capillary action towards the surface and the lime deposited.

Other samples of rock submitted as limestones contained only small amount of lime.

It is also interesting to note that the ashes of many of our native trees contain, contrary to the popular belief, very little potash, but large amounts of lime. A list of the analyses of limestones, shell sands, and timber ashes are given in the appended table:—

Limestones :—

ANALYSIS OF—

Lab. No.	District.	Lime (CaO.)	Calculated as Carbonate of Lime. ($CaCo_3$).	Magnesia (MgO.)	Iron and Aluminium Oxides. ($Fe_2O_3 + Al_2O_3$).	Potash. (K_2O).	Phosphoric Acid. (P_2O_5).	Insoluble Silicates. (SiO_2).	Remarks.
676	Repulse Bay	54·20	96·8	·56	·86	·10	·045	1·39	Burnt lime from sample contains 90·16% CaO ·63% MgO
1,817	near Roma State Farm ..	43·95	..	1·87	6·00	..	..	10·45	
1,818	Biggenden and Degilbo ..	56·00	100·0	trace	1·10	..	..	·35	
292	Parish Barmoya, portion 26v	55·56	99·3	·22	..	..	..	2·80	
293	Parish Barmoya, portion 2 ..	55·01	98·2	·43	..	..	..	·40	
294	Parish Fitzroy, portion 95v.	55·61	99·3	·25	..	..	..	·32	
295	Johansen's Cave Reserve ..	55·32	98·9	·31	..	..	..	·40	
1,644	Goodnight Scrub	54·90	98·1	·94	·22	..	..	·60	
1,645	St. Agnes	55·61	99·3	·67	·17	..	..	·52	
1,646	Currajong	55·23	98·6	·48	·17	..	..	·92	
1,647	Currajong	55·70	99·5	·58	·20	..	..	·53	
1,766	Ballandean	55·50	99·1	·29	·17	..	..	·46	
94	Marmor	39·04	69·7	1·51	3·46	..	·54	22·40	Screenings— Coarse (over 30 mesh) 38·1% Medium (under 30 mesh) 9·6% Fine (under 50 mesh) 8·8% Very fine (under 100 mesh) 43·5%
697	Marmor	41·95	74·9	·83	3·44	·16	·46	19·75	
1163	Goomeri	55·28	98·7	..	..	..	..	1·89	
970	Gayndah Line	54·10	96·6	·99	·52	..	..	2·26	
1,443	Gladstone	54·64	97·6	·58		..	..	1·00	
Reputed Limestones :—									
78	Brooks Camp (Towers) ..	22·80	40·7	14·11	..	..	·25	20·62	
956	Roma State Farm, I. ..	20·35	36·3	..	..	..	..	55·0	Light blue grey rock, with fragments of shell (Desert sandstone)
	(100 ft. well sinkings, II. ..	1·25	2·2	..	..	..	..	81·84	Loose material (slate colour)
1,521	Beaudesert (Bouff Hill) ..	5·30	9·4	·08	..	..	·03	78·78	
1,522	Beaudesert (J. Cochrane) ..	1·23	2·2	·10	..	..	·28	70·65	
1.523	Beaudesert (Bromelton) ..	1·69	3·0	·16	..	..	·33	66·50	

Calcareous Sinter and Marly Deposits :—

1,943	Mirani	24·28	43·3	2·07	..	..	·071	34·19
1,944	Mirani	30·04	53·6	1·04	..	..	·095	33·68
1,945	Mirani	27·56	49·2	1·08	..	..	·085	33·63
1,425	King's Creek, Clifton ..	33·45	59·7	13·50	..	..	..	8·35
1,797	King's Creek, Clifton ..	32·00	57·2	2·38	11·60	..	..	15·77
1,865	Raglan	39·04	69·7	..	4·80	..	..	16·36
1,468	Springsure	34·24	61·2	..	..	..	..	35·00
1,424	Westbrook	15·10	27·0	5·60	..	..	..	45·83
1,436	Kaimkillenbun	28·30	50·5	15·14	..	..	..	17·00

Shell, Sand, and Crushed Coral :—

1,040	Bowen (Coral)	61·84	..	1·51	4·20	..	..	3·10
420	North Queensland	51·12	91·3	..	..	..	..	1·92
421	North Queensland	54·00	96·4	..	..	..	..	·78
1,628	Lucinda Point	4·34	7·7	..	..	..	..	12·52

Ashes :—

..	Belar (*Casurina lepidophloa*)	49·10	87·6	·84	..	4·95	..	..
..	Gidyea (*Acacia homolophylla*)	48·70	87·0	1·52	..	1·10	..	..
..	Brigalow (*Acacia harpophylla*)	54·40	97·1	1·61	..	·69	..	..
..	Apple Tree (*Angophora subrelutina*)	29·65	53·0	8·05	..	4·45	..	..
..	Bottle Tree (*Sterculia Rupertis*)	23·48	41·9	13·35	..	29·02	..	..
..	Brigalow and Sheoak ..	51·00	91·0	·87	3·35	·34	·357	2·73
..	Sisal Hemp	31·86	56·9	21·31	..	8·00	..	..
..	Lantana	16·95	30·3	4·39	..	13·96	..	..

APPLICATION OF LIME TO THE SOIL IN THE SOUTH BURNETT DISTRICT.

Mr. G. B. Brooks, Instructor in Agriculture, who recently paid a visit to the above district, reports:—

During my recent visit to the South Burnett district, the following information was secured in connection with the application of lime to the soil:—

Some two years ago, when on an instructional tour in the above district, samples of the various types of soils were secured for analysis. The analysis, which showed a slight deficiency of available lime, was made known to the farmers with the result that a number decided to carry out some experiments in the application of this substance to their crops. A cheap form of lime, known as "screenings," was used, the cost of which was 8s. per ton in bags, or 5s. per ton loose. The railage—a heavy item—amounted to 20s. per ton.

It may be mentioned that lime is generally applied to the soil with the object of correcting acidity, improving its mechanical texture, &c. In the above instance, however, the idea was simply to supply plant food. It was not expected that any marked improvement would be shown in the crop grown on the limed areas, owing to the seasons being unfavourable to the production of a full crop or what may be termed maximum yields.

Four areas were inspected, particulars of which are as follow:—

C. LARSEN, EDENVALE.

Date of application, September, 1912. Area treated, 30 acres. Amount applied per acre, 6 cwt., harrowed in.

Soil: Very friable scrub loam, volcanic origin, very deep.

Crops grown: Three crops of potatoes have been harvested from limed area; fourth crop in ground.

Results.—A small strip in field was left unlimed. Mr. Larsen reports that so far there is no apparent difference between treated and untreated portions. A patch was also top-dressed at the rate of 5 cwt. per acre, but no improvement was noticeable. Crops from the respective areas were not weighed. The land is in excellent tilth.

C. CHRISTENSEN, HORNLEY.

Date of application, September, 1912. Area treated, 18 acres. Amount applied per acre, 10 cwt., ploughed in.

Soil: Red volcanic forest, clay loam, with tendency to bake. Subsoil of clayey nature, also red in colour.

Crops grown: One crop maize harvested; another now maturing.

Results.—No unlimed or check area in field. Mr. Christensen states that no beneficial effect was noted in last season's crop, but considers the present one, which promises a heavy yield, very much improved.

Previously, this forest area gave very low returns. He also reports that the action of the lime on the soil has been most marked, the

mechanical texture being very much improved. Hitherto the land broke up hard and lumpy; now it turns over quite loose and friable, reducing the cost of preparation very considerably. It may be mentioned that Mr. Christensen is a very enthusiastic and up-to-date farmer, and one who believes in thorough cultivation. He has done a lot of experimenting with fertilisers, green manure, and dry-farming methods.

I was shown a field of maize, the greater portion of which was treated with a mixture of superphosphate and potash at the rate of only 1 cwt. per acre. The difference between the manured and unmanured crops is most pronounced, a large increase in yield being expected from the fertilised area. This result is in conformity with the analysis of this particular soil, which shows a decided deficiency of phosphoric acid, and bears out the remarks appended by the Agricultural Chemist, who stated that good results would be likely to follow an application of superphosphate.

C. FRASER, EDENVALE.

Area treated, 5 acres; 2 cwt. applied to the land previous to planting a crop of oats; also top-dressed a patch of lucerne with the same amount per acre.

No results; top-dressing too light to be of any value.

C. O. PETERSEN, KINGAROY.

This test is also of little value, the application being far too light. A few acres of potatoes, maize, and lucerne were treated at the rate of 3 cwt. per acre. Mr. Petersen states that there has been no apparent difference between limed and unlimed.

Two other farmers—Messrs. Hansen and Larsen—also carried out tests. Time did not permit my visiting them, their farm being a long way out. I was, however, informed by Mr. Larsen's brother that in neither case had any benefit been derived from the lime applied.

Later on, if opportunity offers, further data will be secured on this matter.

ONION-GROWING IN THE SOUTH BURNETT DISTRICT.

By G. B. BROOKS, Instructor in Agriculture.

In a previous report mention was made of the possibilities of this portion of country for the raising of onions; also, the obstacles that would be likely to retard such from becoming an important industry.

While several farmers had small patches, the only large area was that on the farm of Mr. A. B. Postle, Memerambi, who has 30 acres under this crop.

In the raising of small areas the cost of production is seldom recorded, but in the case of a 30-acre paddock the cultivating, keeping clean, &c., is such a large item that the grower can form a pretty correct estimate as to what the outlay would amount to per acre. Particular attention was, therefore, for this reason, directed to the field owned by Mr. Postle.

Soil.—The soil in which the crop was grown is typical of the district. It may be described as of volcanic origin, chocolate in colour, very deep and friable, and naturally well drained. Approximately, one-half the field was originally scrub; the other, forest. That the soil is a very fertile one, is shown by the following analysis:—

	Nitrogen.	Phos. Acid.	Potash.	Lime.
Total elements in soil, per cent. ..	·298	·543	·319	·890
Total elements in lb., per acre ..	10,430	19,005	11,165	31,150
Available plant food, per acre ..	10,430	154	1,876	15,044

The physical properties are very good.

Varieties.—Twenty-four acres were planted with the "Long-keeping Brown Spanish," while 6 acres were under "Early Globes." These were planted during the latter end of May, in rows 20 in. apart; 2 lb. of seed being used per acre.

Climatic Conditions during Period of Growth.—As far as the growing of ordinary crops was concerned, the season was undoubtedly very adverse. The nearest meteorological station, where records of rainfall are kept, is Kingaroy, 7 miles distant. The following table shows the amount of rain that fell while the crop was in the ground. The points registered for the two months previous to planting are also included:—

SIX YEARS' AVERAGE RAINFALL FOR RESPECTIVE MONTHS.

1913.	—	1908–1913.	—
March	1·14	January	5·86
April	0·49	February	3·35
May	3·03	March	4·03
June	4·04	April	1·22
July	0·63	May	0·60
August	0·12	June	2·28
September	1·98	July	1·42
October	0·39	August	1·13
November	0·45	September	1·26
December	2·73	October	2·81
		November	2·04
1914.		December	3·44
January	1·85		
February	3·56	Average, 6 years	28·9

It will be seen from the above records that conditions were very favourable at planting time and during the early stages of growth, the rainfall being a good deal over the average.

From July to November, however, practically no rain fell to be of any benefit to the crop. Notwithstanding the long dry spell, when all other crops had withered up, the onions made fair growth, proving that, given a good start, they will withstand a lot of dry weather.

The Weed Problem.—That the soil and climatic conditions obtaining in this district are eminently suitable for the growing of a good quality of onion has been fairly well demonstrated; but the problem of keeping the weeds in check is a difficult one, and the solving, moreover, is likely to prove disastrous to many who are contemplating the planting of extensive areas during the coming season.

It will be found that the preparation of the land will prove a very important factor in successful onion-growing. Not only should it be put into the best of tilth, but every effort should be made to free the soil from weed seeds; this can only be done by frequent stirring for several months ahead of planting. In the Memerambi and other districts, where the soils are loose and friable and easy to get into condition, this constant working will, unfortunately, in many instances, be neglected.

The keeping of a crop clean, even when every precaution has been taken to rid the land of weed seeds, is a fairly expensive matter, but in dirty land it will, under present labour conditions, become almost prohibitive.

Plate 43.—Commencing Harvesting Operations on Mr. Postle's Farm.

In onion-growing the eradication of weeds is generally performed by a system of hand-weeding (known as "crawling"), on account of the narrow space between the rows. Mr. Postle planted a good deal over the regulation width, so as to be able to use the horse scuffler. This system he is discarding, however. Next season, instead of sowing 20 in., he is to put in the crop in rows 9 in. apart.

Harvesting.—By the end of February the tops had withered down sufficiently to permit of being harvested. It was noticed that the scrub portion matured a little earlier and more evenly than the forest area. This was somewhat contrary to expectations, more especially in regard to ripening.

Unfortunately, the weather has been showery since harvesting operations commenced, and, therefore, unfavourable to the drying of the

bulbs. A continuance of such at this stage will undoubtedly have a tendency to cause second growth to the detriment of quality.

To obviate the necessity of harvesting during February and March, when a good deal of hot moist weather is to be expected, the question of planting two months earlier—about the beginning of April—and selecting an early maturing variety to mature about December, would, I think, be worth consideration. From a perusal of the rainfall table, May is, in this district, practically a rainless month; therefore a good deal of risk is attached to the securing of a good germination by sowing at that time. If it should be found that May is the best month to put in the main crop, it might be of considerable advantage both in regard to

PLATE 44.—A FAIR SAMPLE OF MR. POSTLE'S CROP.

harvesting and market to have at least a portion of the crop coming in early in the season (December).

Yield.—So far only a few acres have been harvested, and from them a yield of 4 to 5 tons per acre of Brown Spanish and a ton less of the Early Globe has been secured.

Had the crop been planted, say, 12 in. instead of 20 in. apart, the yield would have been much greater. It was observed, where growing very thick in the rows, that the size was equal to where they were several inches apart.

Cost of Production.—The information secured in regard to cost of production is of little value, as the methods at present in use will, in all probability, be considerably improved upon next season. It may be

mentioned that an experienced grower from Victoria, with a full equipment of appliances requisite for the onion industry, is commencing operations in the Memerambi district on a fairly large scale.

Probable Expansion of the Industry.—An endeavour was made to secure information as to the area likely to be put under onions in this district during the coming season. The following is a list of probable growers:—C. Jessen, 30 acres; H. Hannant, 20 acres; Evans Brothers, 30 acres; J. Graham (Victorian) and A. B. Postle, 25 acres each; H. Christensen, 10 acres; J. Coe, 12 acres; A. Stephens, 8 acres; S. Davis, 6 acres; M. Carmody, 6 acres; —— Hopkinson, 5 acres; J. Kurse, 5 acres; —— Burnham, 3 acres;—a total of 185 acres.

THE RELATION OF COTTON-BUYING TO COTTON-GROWING.

Above is the title of a very interesting and, both to growers and buyers of cotton, a most valuable Bulletin (No. 60) on the subject issued by the United States Department of Agriculture.

It is pointed out that "greater discrimination must be used in the buying of cotton before the farmers will put forward their best efforts towards the development of a new long-staple industry in the United States. The fundamental agricultural improvement that requires commercial co-operation is the preservation of superior varieties, so that a uniform product can be obtained. For manufacturing purposes, uniformity is an even more important quality than length of staple, and one that must be guarded continually in the production of long-staple cotton. It is much easier to breed new varieties than it is to keep them pure and uniform after they have passed out of the hands of the breeder into the field of commercial production. There is a misleading popular idea that varieties of cotton are bound to deteriorate, and that new seed must be planted every few years in order to maintain the crop; but such deterioration can be just as definitely avoided as wounds can be protected from infection.

"The most frequent source of the infection that causes a variety of cotton to degenerate is mixture of seed or crossing with other varieties. The planting of different varieties close together and the exchange of seed at the gin are the usual causes of contamination. When mixture with other kinds of cotton is avoided, it is still possible for a variety to degenerate in the sense of losing its uniformity, unless care be taken to remove the 'sports' or aberrant plants that continue to appear in even the most carefully selected stocks. To 'rogue' out these degenerate plants is as necessary as to prevent mixing with other varieties. It is only by observing these two precautions of avoiding mixture and roguing out the 'freaks' or 'sports,' as they appear, that varieties are kept from deterioration and made to serve the purposes of production for many years. In the case of Sea Island cotton, in South Carolina, in order to preserve the uniformity of fibre so much desired by the manufacturer, the Sea Island planter raised the crop of each year from seed derived from a single

plant. In order to do this, it was necessary to select a superior individual three or four years in advance, and keep its progeny separate while the stock of seed was being increased; but, now that the system of buying has been changed, and special contracts are no longer made, the policy of strict selection is being relaxed. A rapid deterioration of the Sea Island crop is said to have taken place, and this is easily understood from the diversity that exists in many fields. Some of the planters have abandoned Sea Island cotton altogether, and are now planting Upland short-staple varieties. Hybrids between the Sea Island and Upland types are of frequent occurrence, thus adding another factor of diversity and deterioration. Farmers will not take more pains to grow good cotton merely for the satisfaction of knowing that the buyer can make more money out of it. The farmer must get at least enough advantage to induce him to grow the cotton, or the buyer loses his business, and the manufacturer also suffers when the farmer ceases to produce the necessary raw material. It is not what the manufacturer pays for the cotton, but what he gets for it, that determines production. The general underlying fact is that most farmers are unaccustomed to take the precautions that are necessary to preserve uniform stocks, and have no adequate conception of the need of such precautions. The work of the Department of Agriculture is of an educational character; but the information that the Department can give the farmer is not likely to be used when it means additional care and effort without any corresponding advantage.

"When the farmer asks how much more his long-staple crop will bring if he pulls out all the short-staple plants in the field, he can get no direct assurance. He can be assured that his cotton will be worth more, but not that he can get more, for the chances are that the buyers will be unable to detect the admixture of short cotton; but, if the farmer knew that his field was to be inspected, and that the presence of short-staple plants would be detected and would result in his receiving a lower price for his crop, he would not hesitate about taking the trouble to pull them out. Farmers are willing enough to adopt easier methods or crops that can be raised more cheaply; but the production of good cotton requires additional attention—something beyond what the farmer has been accustomed to give in raising short staples—and some positive inducement becomes necessary or the extra care will not be taken. The present system of buying without adequate discrimination means the same average price for lots of cotton that differ greatly in value. Doubtless it is an easier and more convenient system for the buyers to take their cotton at flat prices and classify it afterwards into the different qualities required by their various customers; but, whatever the commercial advantages of this system, it is certainly unwise and unjust in its relation to the farmer. It takes what belongs to the good farmer and gives it to the poor farmer. The farmer who raises cotton above the average in quality is mulcted to make up for the loss on cotton that is below the average. When the nature of the system is considered, it is easy to understand that the general tendency has been toward the growing of inferior cotton rather than to the taking of extra pains from which no advantage could be gained.

"It is not a question of paying more for the cotton, but of paying more to the farmers who produce good cotton and less to those who produce bad cotton. This simple expedient would do more than any amount of exhortation to increase the proportion of farmers who would take the care that is necessary to produce good cotton. Buyers who really have the powers of discrimination that are needed in their business would have no serious difficulty in learning how to determine the value of the crop in the field much more reliably than they can determine it by drawing samples from a bale. The risks they now take in trusting to bale samples alone could be avoided almost entirely by learning how to judge the cotton in the field.

"UNIFORMITY BEST DETERMINED BY FIELD INSPECTION.

"Uniformity in the length and strength of the fibre is one of the most important factors in determining the value of long-staple cotton to the spinner. One of the most serious defects of the present system of buying on the basis of samples drawn from the bales is that it is not adequate for the determination of uniformity. Buyers commonly fail to detect an admixture of 5 or 10 per cent. of short cotton; and even 15 to 20 per cent. often 'gets by.' The buyers, of course, are not inclined to admit this, but the fact is well known to manufacturers.

"By field inspection admixtures of 1 or 2 per cent. are quite as easily and definitely detected as percentages of 10 or 20 per cent. A buyer or inspector having sufficient familiarity with a variety could establish definite percentage grades of purity of stock for all of the cotton of a neighbourhood, and these percentages could be used as a basis for buying.

"The short-staple plants or inferior individuals stand out very distinctly, so that they can be seen at a glance by those who have sufficient familiarity with a variety, and they can be pulled out or counted as easily as the same number of weeds that a careless farmer might leave in his field.

"In failing to make use of the opportunity of judging cotton in the field, the present system of buying becomes wasteful and inefficient."

We regret that space will not allow of the republication of Mr. O. F. Cook's report (Bionomist in Charge of Crop Acclimatisation and Adaptation Investigations) in full; but we think enough has been said to show conclusively that, to ensure a good price to the farmer for his cotton, the best course of procedure is—not to depend upon the value of the cotton as per samples from the bale of ginned cotton, but to see that the cotton fields are free from admixtures. We have seen both in the old and the present days of cotton-growers in Queensland a woeful admixture of long and short staple and sport cottons in the fields, and we have seen mixed seed—black seed, woolly, green, and white seed—all sown just as it came from the gin. This was all very well in the days of the cotton boom during the American Civil War, but to-day the manufacturers demand a uniform long-staple or a uniform short-staple cotton, and it is imperative that cotton-growers—*i.e.*, farmers—should be clear on the point that mixed varieties cannot command the price payable for those of

a uniform character. Anyone conversant with any one variety can go into a field or cotton and pick out the "rogues" from the other plants even when the bolls have not yet opened.

The Queensland Department of Agriculture is now prepared to buy cotton from farmers who are wise enough to know that a cotton crop will pay them better than many other crops, and yet leave them six months of the year to grow other crops on the same land. As shown in the Bulletin quoted, the reason of low prices is often caused by the admixture of long and short staple in the same field. If a farmer elects to plant long-staple, but also plants on the same field short-staple, the result is that he gets a low price; but let him plant a uniform long or short staple cotton, and in the former case eradicate the short, and in the latter the long staple variety, then he can command the highest price. This all goes to show that field inspection is the best method of ensuring to the farmer the best price (or the lowest) for his crop. Neither the grower, buyer, nor manufacturer has, at present, any familiarity with cotton in the field—either with the plants as they grow or with the fibre as it comes from the bolls.

"A certain amount of time is required to become familiar with the plant and lint characters, as they have to be judged in the field, but anybody who is able to make the fine discriminations necessary in classing cotton in the bale would have no serious difficulty in learning to distinguish the different kinds of plants in a mixed field or in recognising differences in the lint while still on the seeds. Indeed, the recognition of such differences is really much easier than the classification of cotton in the bale, because the differences are greater and more obvious, and because it is seldom necessary to depend upon one character alone. Varieties differ, usually, by many characters, and even in the same variety several characters are likely to be changed under a different set of external conditions. If the lint is shortened by adverse conditions, the bolls and leaves are likely to be smaller and the whole aspect of the plants will be different. Sufficient familiarity with the characters and behaviour of a variety enables one to tell in advance with considerable confidence the length and strength of the lint before taking it in hand, or even before the bolls have opened.

"OTHER CAUSES OF UNEVEN FIBRE.

"It is true that mixing varieties and diversity among the plants in the field are not the only causes of inequality in the length and strength of cotton fibre. Unless the conditions of growth are favourable, even the best variety may yield only inferior cotton. Adverse conditions during a part of the crop season may render the fibre uneven, notwithstanding the care that may have been taken to keep the stock pure. As a result of differences in the soil, one part of a field may grow good fibre while another part of the same field may yield only inferior fibre. When one side of a field is allowed to grow up in weeds, an adverse effect on the fibre is often apparent. Inequalities of soil or moisture supply are often shown in a striking manner in the growth of the plants.

"Any sudden change of conditions of growth, such as checking the plants by drought or forcing them into very rapid development by heat and moisture, is likely to affect the quality of the fibre as well as the yield. The crop is reduced by the shedding of floral buds and young bolls. Bolls that are farther advanced are not so likely to be shed, but they often fail to reach normal maturity and produce weak inferior fibre. Thus, long and short fibre or strong and weak fibre are often to be found on the same plant.

"Some varieties have a tendency to inequality in the length of lint, the fibre at the base of the seed often being much shorter than that at the top. This difference of length sometimes amounts to half an inch or even more, giving the so-called 'butterfly' outline, when the fibre is combed out from the sides of the seed. This factor of inequality may be avoided by choosing varieties that do not have the undesirable butterfly tendency. The new Durango type of long-staple cotton is unusually free from this defect.

"There are other factors of inequality in addition to the mixing of varieties or the failure to continue selection. A farmer who has planted pure seed may still have only inferior cotton if his soil is poor or his methods are careless either in raising or picking the crop, or if the fibre is damaged by rain during the harvest season. The condition of the cotton must be taken into account apart from the quality. Good cotton may be in bad condition, but poor cotton cannot be made good by careful handling at the end of the season. The farmer who plants mixed seed cannot produce uniform fibre, no matter how favourable the conditions or how careful the methods in other respects. Quality is best determined by field inspection, for any form of inequality can be detected in the field much more easily than in the bale."

It will be obvious that, although the Bulletin above referred to deals principally with long-staple cotton, the remarks therein are equally applicable to a crop of short-staple Upland. In either case uniformity of staple is the desideratum, and this can be attained only by the careful farmer. Furthermore, it can easily be understood how inspection in the field, just as in the case of sugar-cane, must be a far better guide to the value of the crop than an examination of samples taken from bales of ginned cotton.

CLEARING LAND BY MACHINERY.

A demonstration of clearing land of trees and stumps by the aid of the Trewhella horse and hand power winches was given on Thursday afternoon, 2nd April, on the Murarrie Estate, near the Murarrie Station, Cleveland Railway.

A large number of persons interested in such work and machines were present, including the Hon. J. White, Minister for Agriculture, and representatives of various Government Departments, &c.

The hand power or "monkey" winch was first attached or anchored to the bottom of a red stringy-bark tree, and the pull rope passed round another tree of about 2½ ft. diameter about 60 ft. away. A snatch block

doubling the power of the winch and a rope grab to grip the pull rope at the required distance were used. The attachments are most ingeniously designed, are so simple that anyone can handle them, and they can be fixed in position in a few seconds. Mr. J. T. Trewhella, who was operating the machines, then took a few strokes with the handle upon the fast gear (pump-handle motion) to tighten up the tackling. By using this fast gear the strain is got on quickly, and no time is wasted. The handle was then transferred to the power gear, which is the pawl and ratchet mechanism of their (Trewhella) jacks applied to a winding drum, and a powerful strain put on. An assistant now lent aid on the handle, and in a short time the tree being pulled was seen to bend forward, cracking sounds were heard from the base of the tree, and the ground for some feet around was seen to heave upwards. The motion forward increased in rapidity, and in 3½ minutes from the beginning of the pull the tree crashed down to the ground.

The pull rope was then fastened to a gum tree of about same diameter and same distance away, the time taken to bring that down being shorter than was taken in dealing with the first tree.

Those present then asked that the horse power winch should be put in operation on a solid looking stump about 3 ft. high and 2½ ft. in diameter at the top. This machine had a more powerful appearance, was mounted on runners instead of wheels as was the hand power winch, and was anchored to the tree that had served the same purpose for the smaller winch. The ropes were of a greater diameter, although similar snatch blocks and rope grabs were used. The tackling being adjusted, a horse was brought up and attached by traces to a thin wire rope, which worked round a wheel upon the top of the winch, this rope being pulled out by the horse until the other end, which had been lying loose stretched out on the ground, was drawn up to the wheel. The horse was then unhooked from the end of the rope which had been drawn out and taken back to the winch. The wheel round which the rope passed was now turned over, the traces hooked to the short end of the rope, and the horse pulled out as before. This was repeated three or four times and the stump drawn completely out. After the first pull, the roots were heard cracking and the soil around began to heave upwards. When the third pull was made, the roots came out carrying a large mass of soil with them, and with the next two pulls the stump, roots and all, was pulled right clear of the hole.

The spectators expressed their entire satisfaction with the work done, and agreed that these winches were the most powerful "forest devils" which had come under their notice, and gave the opinion that there was a great future before them in Queensland.

As the afternoon was passing away, a good many left to catch their trains, but a number remained and requested that, as a final test, the horse power winch should be attached to another red stringy-bark tree which was of greater size than that which had been used as an anchor. The attachments were quickly made, the pull rope being placed about 8 ft. up the trunk. That tree was hauled out even quicker than the stump, but in this instance no time was lost in explanations and only strict

business attended to. The spectators remaining were unanimous in agreeing that that was the best effort of the day, and illustrated the power of the winch in a very effective manner.

Mr. A. Robinson, the Queensland representative of Messrs. Trewhella Bros. Pty., Ltd., was in attendance, and assisted to make the demonstration satisfactory to those who were present by finding what was desired to be done and answering questions regarding the machines, their equipment, &c.

Other demonstrations are to be given at different centres in Southern Queensland during the next two months, and those desiring to be present are advised to communicate with Mr. A. Robinson, Petrie's Bight, Brisbane.

THE WORLD'S PRODUCTION OF COTTON: THREATENED SOURCES OF SEA ISLAND VARIETY.

The "Agricultural News," Barbados, takes the following pessimistic note on the probable fate of Sea Island cotton in the United States from "The West India Committee Circular" of 27th January, 1914:—

Professor John A. Todd, who visited the cotton-growing areas of the United States last summer, gave the members of the Royal Philosophical Society of Glasgow, on 13th January, some impressions of his visit. Over 60 per cent. of the cotton production of the world was, he said, drawn from the United States, and to that percentage Texas alone contributed one-third. In 1831 the production by the United States amounted to 1,000,000 bales, and in 1911 it had increased to 16,000,000 bales. There was a cotton area of 450,000,000 acres, but the acreage under cultivation was only 35,000,000 acres. Statistics showed that the tendency had been for the price of cotton to rise, and there were two principal reasons why the area of production in the United States was not largely increased. One was that the amount of labour required was very heavy and that the cost of negro labour was going up enormously. Cotton was selling at 12 cents per lb., and the cost of picking alone was 2 cents, or a sixth of the selling price. Mechanical pickers had been introduced, but so far these cost as much as hand labour.

The other cause limiting the area of production was the ravages of the boll weevil, a plague which had been allowed to spread probably largely owing to the inefficiency of negro labour. The weevil was now threatening the area in which Sea Island cotton, the highest quality of cotton, was grown in the United States, and the chances were that this crop might also disappear. In that case there were only two parts of the world which could supply the defect, the West Indies and Egypt.* Professor Todd, in conclusion, hazarded the view that there were only two things that the United States could do—either improve the quality

* Queensland can produce and has produced as good Sea Island cotton as any other country in the world, and a cotton expert from Texas, U.S.A., now in Queensland, has, after examination of the country in the Central districts, given it as his opinion that there are tens of thousands of acres along the Central Western Railway Line and on the coast which will produce Sea Island and Uplands cotton to perfection.

and value of its crop, or give it up and let other countries which had cheap labour take up the burden of growing cotton. As it was at present, the cost of labour was so great as to make cotton-growing approach the non-profitable, and, if things did not change, the chances were that the great supply of cotton for the world in the future might come from other countries, and these countries mostly British possessions. A large number of lantern views were thrown on the screen, these illustrating among other things the great wastage of cotton by the American method of handling.

COTTON FROM AUSTRALIA.

From the report of the work of the Imperial Institute, for 1912, we take the following note on samples of cotton sent from Western Australia and Queensland for valuation. The report is certainly satisfactory to a certain extent, both as regards Western Australia and Queensland, the cottons of which States were examined with the results that a sample of "Durango" cotton from Western Australia was valued at 9d. per lb., with "middling" American at 6·37d. per lb., and "good" Abassi at 11d. per lb. A sample of Sea Island cotton from the same State proved to be coarser than ordinary Sea Island cotton, but was of good colour and length and was valued at 13d. per lb., with "choice" Georgia at 12½d. per lb.

A sample of seed-cotton from Queensland yielded a rather coarse, harsh, weak lint, which was classed as "barely good middling" and valued at 6·80d. to 6·90d. per lb., with "middling" American at 6·46d. per lb. Two samples of Egyptian cottons from Queensland were under examination at the close of the year.

A NEW POTATO DIGGER.

Ever since potatoes have been grown in this and other States of the Commonwealth, the farmer has laboriously turned out his potato crop by the aid of the digging fork and the long-handled shovel, and the man who could dig 1 ton of potatoes in a long day was considered a "ringer" at the work. Numerous have been the attempts by agricultural mechanics to produce a machine which would do away with the laborious work of digging and substitute mechanical power for hand labour. Amongst those who have at various times placed their machines in evidence, or rather on trial, is Mr. Daniels, who has for some years devoted himself to the evolution of a satisfactory machine, with varying success. He has now evolved a machine which was tried on Wednesday last (15th April) on Mr. Willmann's farm at Bannockburn, a few miles from Beenleigh. This machine was built under Mr. Daniels's supervision at Mr. Bloomer's foundry at Beenleigh, and it embodied all the latest improvements shown to be needed by the old machines.

The potato field chosen on Mr. Willmann's farm was one, the crop on which was almost invisible owing to the dense growth of weeds of

various kinds which, owing to the wet weather, had grown to a height of over 2 ft. If the machine could do clean work in such a tangle it would be a marvel, and the visitors and farmers assembled gave it as their opinion that no machine at present invented could go five yards without clogging. Mr. Daniels's machine weighs 8 cwt., and was drawn by two horses. The rows of potatoes were some five chains in length. Once started, the end of a row was reached in about three minutes. On looking back, it was seen that the potatoes were all lying in the middle of the row. All the weeds were completely buried and the land left perfectly level. No cut potatoes could be found, nor was any potato, after diligent search, found undug. From what we saw, we considered that the machine had a very severe trial, with a most satisfactory result. It is calculated to dig 4 acres a day. The soil was a rich sandy loam.

We understand that further demonstrations will be given in various potato districts, of which due notice will be given.

TEFF GRASS.

Of late much interest has been taken in Queensland in Teff Grass, a native of North-east Africa. In the last issue of this Journal, Mr. G. B. Brooks, Instructor in Agriculture, drew attention to the fact that this is essentially a hay grass of no great value for grazing, and also that it is an annual. The "South African Gardening and Agriculture," from which journal we take the following note on the grass, practically views its value in the same light as does Mr. Brookes:—"The usefulness of Teff as a fodder crop is well known. It is an easy crop to get during the rainy season, grows quickly, stifles weeds, and makes excellent hay. Sowings can be made during the present month by broadcasting 5 to 6 lb. per acre and lightly hoeing the ground. It must not be expected that it will stifle weeds that have become established before the Teff is sown. Teff should be looked upon as a grass for the high veld, and not one which can be expected to do well in warm districts. Its popularity is, no doubt, due to the fact that it gives an immediate return, and is very inexpensive to raise, but it does not add to the permanent value of a farm such as is obtained by the sowings of many other grasses of a perennial character. Though it is, no doubt, an excellent farm crop, yet it is quite possible we shall consider it overrated in a season or two when other grasses are better understood."

EXPERIMENTAL FEEDING OF STOCK ON ZAMIA LEAVES.

A correspondent comments as follows on a paragraph in Mr. Burton Cleland's paper on "Experimental Feeding with some Alleged Poison Plants of New South Wales," which appeared in the "Agricultural Gazette of New South Wales," and subsequently in the March issue of the "Queensland Agricultural Journal":—

Re General Notes, I notice, by experiment at Milson Island, a cow was fed with Zamia leaflets for five months without producing "rickets."

Either the climatic conditions of the island are different to ours, or else the plant has not developed its poisonous properties yet. In this district cattle were reared on Zamia-infested areas with no sign of "rickets" until about fifteen years ago. I remember the late E. G. Woods, of Calliungal, remarking, before he left that station, that he never saw a symptom of "rickets" in his time; and in two years afterwards there were over 1,000 head of rickety cattle on the top end of the run grazing on exactly the same country. I have seen a team of working bullocks turned out (and apparently sound and well) at about 3 o'clock to-day, and the next day six of the bullocks were that bad that they could not get their hind part off the ground. I have put cattle in a paddock with only a few plants, and in less than a week eight or ten of them developed "rickets."

I had the paddock all cleared of Zamia nearly five years ago, and have never seen a sign of "rickets" in the cattle there since.

VICTORIAN BEET INDUSTRY.

FACTORY TO BE CLOSED.

From a Melbourne contemporary, the "Australian Sugar Journal," we extract the following somewhat gloomy account of the prospects of the beet industry on the Kilmany Estate; though it will be seen that in other districts the outlook is much brighter.

The Kilmany Estate was resumed by the Government two or three years ago, with the object of assisting the beet sugar industry; and one of the obligations imposed upon settlers was that each should cultivate for a certain number of years a certain acreage of sugar beet. This condition has now been in operation for two years, and the result of the experiment, as disclosed by the statements made by the farmers, has up to the present been a complete and dismal failure. The main object of the meeting with the Minister for Lands was to ask for the abandonment of this compulsory provision, and to secure release from its consequent restrictions.

The enforced cultivation of beet has resulted in serious pecuniary losses to the settlers, and has done nothing to advance the interests of the industry. These two facts stand out clearly above all other issues. Settlers under the terms of occupation of their farms were compelled and bound down by the Government to engage in work which has not only not returned a profit, but has actually cost them money out of pocket. Almost without exception they are men with little capital, and for the first few years of occupation they must, if they are to succeed, husband carefully their slender resources, and devote the whole of their labour to profitable work. The beet industry in itself stands in no way condemned by this experiment, but the futility and the stupidity of binding men down to certain cultural operations, the results of which are wholly problematical, has been exposed. It is a significant fact

that during these two years not one farmer on the estate raised a profitable crop, and it was asserted that the Government plots were also carried on at a substantial loss.

Round about Boisdale and Maffra the cultivation of beet is being successfully undertaken, and this reverse at Kilmany should not retard the industry. It should, however, free the settlers from an irksome restriction, and give them an opportunity of giving the whole of their attention to work which they know is profitable, and which is also congenial.

Taking the opinions expressed by the various farmers who interviewed the Minister, we select the following as typical of their complaint:—"I don't think," said one, "that on the whole of this estate you will find one crop that is going to pay. . . . My beet crop is worthless, yet I am not allowed to feed my starving stock upon it." Another remarked: "We have to subsoil the land, and the cost of cultivation is at least £10 per acre. We get very little gross return, and are out of pocket at the end of the season, after having done an immense amount of work." Yet another said: "I have been growing beet for two years. I have paid for horse hoeing. Last year I lost £50. My crop won't be 25 tons from 10 acres. My losses this year will be at least £57 10s.; and, if I have to haul the crop to the factory, it will be another £15." These are typical of a number of cases; and it was definitely stated that in no single case had beet been grown on Kilmany Estate at a profit. [A report has since been published to the effect that the State Cabinet have decided to close the Maffra Sugar Factory after the approaching season, and to release settlers from the beet-growing conditions of their leases.—Ed. "A.S.J."]

THE AMERICAN BEEF "TRUST."

Mr. J. S. Mills, a native of Dunedin, who has been engaged for several years in ranching in Alberta, Canada, has recently been on a visit to his original home. He apparently does not share the opinions of some people as to the effect of the operations of the American Beef "Trust." Swift and Company went into Edmonton, the capital of Alberta, six years ago, and put up an eight-storey plant covering a large area. When the Swifts appeared steers were worth 4½ cents (say, 2¼d.) per lb. live weight; they were selling last November at 6½ to 7 cents (say, 3¼d. to 3½d.) per lb. live weight. Since then P. Burns and Company, the original packinghouse men in Alberta, had moved alongside the Swifts in open competition. The result had been a great boon to the farmers. Within three years the price of steers had increased one-third, and the opening of the United States markets meant still higher values for meat, not only from Canada, but from Australia, New Zealand, and the Argentine. The experience of the Alberta farmers in respect to the so-called meat trust was that the appearance of Swifts had induced competition, had kept prices up, and made for an improvement in the class of cattle raised.—"Pastoralists' Review."

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF MARCH, 1914.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lady Melba	Holstein	6 Mar., 1914	1,243	3·4	46·77	First calf.
Lavinia's Pride	Ayrshire	11 Dec. 1913	803	4·5	40·62	
Madame Melba	Holstein	10 Nov. ,,	985	3·6	39·40	
Butter ...	Shorthorn... ...	27 Sept. ,,	719	4·8	38·90	
Glen ...	,, ...	27 Oct. ,,	670	4·7	35·76	
Pauline ...	,, ...	8 Oct. ,,	671	4·6	34·67	
Nellie II. ...	,, ...	5 June ,,	697	4·4	34·62	
Bee	Jersey	7 July ,,	507	6	34·5	
Daisy ...	Holstein	14 Feb. ,,	696	4·4	34·37	
Honeycombe	Shorthorn... ...	7 June ,,	603	5	34·04	
Miss Lark ...	Ayrshire	27 Dec. ,,	732	4	32·71	
Miss Jean ...	,, ...	13 Jan. ,,	655	4·4	32·35	
Cocoatina ...	Jersey	19 May ,,	488	6·4	31·50	
Queen Kate	Ayrshire	4 Jan., 1914	791	3·5	30·69	
Lady Loch...	,, ...	31 Aug., 1913	764	3·6	30·56	
Conscience...	,, ...	30 Jan. ,,	616	4·4	30·52	
Miss Bell ...	Jersey	25 Sept. ,,	619	5·2	30·50	
Burton's Lily	Shorthorn... ...	29 Dec. ,,	645	4·2	30·34	
Countess of Brunswick	,, ...	22 July ,,	555	4·8	30·02	
Silver Nell...	,, ...	26 Sept. ,,	637	4·2	29·96	
Burton's Lady	,, ...	23 June ,,	511	5	28·84	
Sweet Meadows	Jersey	20 Aug. ,,	328	7·6	28·50	
Bluebelle ...	,, ...	13 July ,,	413	5·8	27·20	
Miss Melba	Holstein	22 Jan. ,,	642	3·8	27·18	
Bella ...	Ayrshire	16 Dec. ,,	574	4·2	26·99	
Rosine ...	,, ...	27 Nov. ,,	645	3·7	26·54	
Lennie ...	,, ...	1 Sept. ,,	619	3·8	26·24	
Gem... ...	Shorthorn... ...	8 Aug. ,,	470	4·6	24·31	
Lonesome ...	Ayrshire	26 Oct. ,,	498	4·2	23·54	
Miss Edition	Jersey	19 July ,,	282	7	22·50	
Miss Morton	Shorthorn... ...	14 Oct. ,,	598	3·4	22·48	
Skylark ...	Ayrshire	2 Feb., 1914	467	4	20·87	First calf.
Lady Brunswick	Shorthorn... ...	27 Oct., 1913	476	3·8	20·15	ditto

The cattle were fed on natural pasture only.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, MARCH, 1914.

The following are the final figures for the 1913-14 Egg-laying Competition :—

Competitors.	Breed.	March.	Total.
Moritz Bros., S.A.	White Leghorns ...	124	1,564
A. H. Padman, S.A.	Do.	94	1,536
Loloma Poultry Farm, N.S.W.	Do.	118	1,514
J. R. Wilson	Do.	82	1,483
T. Fanning	Do. (No. 2)	92	1,472
R. Burns	Black Orpingtons (No. 2)	116	1,453
E. A. Smith	White Leghorns (No. 2)	109	1,435
Range Poultry Farm	Do.	66	1,405
J. F. Coates	Do.	89	1,382
O.K. Poultry Yards	Do.	58	1,376
R. Burns	Black Orpingtons (No. 1)	98	1,366
T. D. England	White Leghorns ...	79	1,365
E. A. Smith	Do. (No. 1)	109	1,360
H. Tappenden	Do.	83	1,353
W. D. Bradburne, N.S.W.	Do.	84	1,346
Mrs. Munro	Do.	84	1,338
F. McCauley	Do.	55	1,315
S. E. Sharpe	Do.	49	1,311
A. F. Camkin, N.S.W.	Do.	85	1,310
Yangarella Poultry Farm	Do.	86	1,301
Jas. McKay	Do.	44	1,301
H. Hammill, N.S.W.	Do.	92	1,298
A. T. Coomber	Do.	58	1,294
Cowan Bros., N.S.W.	Do.	64	1,292
Mrs. Sprengel, N.S.W.	Do.	67	1,280
J. Zahl	Do.	33	1,279
Doyle Bros., N.S.W.	Do.	43	1,265
T. Fanning	Do. (No. 1)	89	1,264
Mrs. Craig	Do.	79	1,255
R. Jobling, N.S.W.	Do.	63	1,232
J. Archibald, N.S.W.	Do.	74	1,225
C. Leach, N.S.W.	Do.	61	1,218
J. Murchie	Brown Leghorns ...	49	1,218
J. Gosley	White Leghorns ...	73	1,193
D. Grant	Do.	47	1,132
A. C. Collis, N.S.W.	Do.	73	1,161
Mrs. Bieber	Brown Leghorns ...	57	1,139
T. Stephens, N.S.W.	White Leghorns ...	55	1,118
J. Andersen, Victoria	Red Sussex	57	1,112
A. Schbrowski	Brown Leghorn	40	1,109
Totals	...	2,988	52,420

GENERAL REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, 1913-1914.

The tenth egg-laying competition was brought to a close on 31st March, 1914. Owing to the large number of entries received, 10 additional pens were erected. In all, 42 pens were entered; but, owing

to 2 withdrawals, only 40 competed. These were made up as follows:—White Leghorns, 34 pens; Brown Leghorns, 3 pens; Black Orpingtons, 2 pens; Red Sussex, 1 pen; making a total of 240 birds. The number of eggs laid during the twelve months was 52,420, an average of 1,310·5 per pen, or 218·4 per bird—constituting a new world's record. The birds were a splendid lot of layers, otherwise the above results could not have been obtained, and the competitors are to be congratulated on the general improvement. There were 129 broodies recorded—a very large percentage; but, fortunately, they were very easily put off.

FEEDING.

The morning feed consisted of equal quantities of bran and pollard (by measure, not by weight), together with 1¼ lb. Sunlight oilcake and ¾ lb. of desiccated meat, mixed into a crumbly mass with hot water in winter and cold in summer. Three-quarters of a pint of this was fed each morning, about 6.30, except on Sundays, when oats were substituted. At 9 o'clock the pens were again visited to see if all the food had been cleaned up, and to give more to pens that needed it. This was found to be a better method than giving the full amount at once, with the result that perhaps some food would be left to clean up. This system was followed throughout, except during January, when, desiccated meat being unprocurable, it was omitted from the ration, and the laying fell off somewhat in consequence. At midday chaffed green lucerne was fed, a good handful to each pen, and a little soup meat when available (about twice a week), also a handful per pen. The evening meal consisted of wheat, as much as the birds would eat up clean, about 1 pint more or less according to the capacity of the birds, as all pens do not eat alike. Great care was taken throughout to get all birds to eat as much as possible, without leaving any. Fresh clean water was given every morning, and shell grit was at all times available in the pens.

The houses were cleaned out once a week. The birds were in splendid health all through, the mortality being 10 deaths during the year, for the most part from ovarian trouble.

The following are the prize-winners:—	£	s.	d
First—Moritz Bros., Kalangadoo, S.A. (W. Leghorns) ..	7	7	0
Second—A. H. Padman, Pirie street, Adelaide, S.A. (W. Leghorns)	4	4	0
Third—Loloma Poultry Farm, Rockdale, N.S.W. (W. Leghorns)	2	2	0
Monthly prizes of 10s. for the largest number of eggs each month—			
Moritz Bros.—October (1/3), November, December, January, March	2	3	4
A. H. Padman—April, May, June	1	10	0
R. Burns—July, February	1	0	0
J. R. Wilson—August, September	1	0	0
E. A. Smith—October (1/3)	0	3	4
J. Archibald—October	0	3	4

Competitors.	Breed.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Grand Totals.
Moritz Bros., Kalangadoo, S.A.	White Leghorns	73	115	114	127	145	142	154	158	152	143	117	124	1,564
A. H. Padman, Pirie street, Adelaide, S.A.	Do.	137	148	139	79	130	142	145	142	138	133	109	94	1,536
Loloma Poultry Farm, Rockdale, N.S.W.	Do.	60	121	133	144	132	143	152	146	140	119	106	118	1,514
J. R. Wilson, Eudlo, N.C. Line	Do.	107	131	114	139	156	147	152	127	130	113	85	82	1,483
T. Fanning, Ashgrove, Brisbane	Do. (No. 2)	100	140	110	133	140	130	136	137	140	126	98	92	1,472
R. Burns, Sladevale, Warwick	Black Orpingtons (No. 20)	45	90	107	151	135	140	150	131	144	123	121	116	1,453
E. A. Smith, Hawthorn street, Paddington	White Leghorns (No. 2)	109	110	67	112	142	136	154	136	137	111	112	109	1,435
Range Poultry Farm, Toowoomba	Do.	36	128	115	147	149	142	142	138	140	115	87	66	1,405
J. F. Coates, Rockhampton	Do.	75	124	97	117	134	126	140	132	138	119	91	89	1,382
O.K. Poultry Yards, Toowoomba	Do.	110	122	112	135	144	133	140	123	124	95	74	58	1,376
R. Burns, Sladevale, Warwick	Black Orpingtons (No. 1)	28	85	121	132	138	144	149	137	137	95	102	98	1,366
T. D. England, Brisbane	White Leghorns	89	113	112	141	131	128	128	128	134	104	78	79	1,365
E. A. Smith, Paddington	Do. (No. 1)	77	79	48	106	147	146	148	142	140	115	103	109	1,360
H. Tappenden, Barton street, Maryborough	Do.	90	101	97	125	130	122	136	136	121	115	97	83	1,353
W. D. Bradburne, Bexley, N.S.W.	Do.	64	91	70	98	139	141	151	142	143	126	97	84	1,346
Mrs. J. R. D. Munro, Sunnyside, Warwick	Do.	100	91	64	113	127	127	141	137	134	118	102	84	1,338
F. McCauley, Clifton	Do.	117	119	86	140	127	121	124	110	113	110	93	55	1,315
S. E. Sharpe, Childers	Do.	36	133	133	146	136	122	121	116	119	110	90	49	1,311
A. F. Camkin, Kogarah, N.S.W.	Do.	46	87	90	109	128	121	141	146	135	117	105	85	1,310
Yangarella Poultry Farm, Indooroopilly	Do.	86	86	65	89	142	125	148	136	130	118	90	86	1,301
Jas. McKay, Gatton	Do.	86	107	92	102	129	137	140	127	119	114	104	44	1,301
H. Hammill, Kogarah Bay, N.S.W.	Do.	33	77	71	135	152	133	144	128	132	116	85	92	1,298
A. T. Coomber, Bundaberg	Do.	61	79	97	114	141	142	143	141	139	109	70	58	1,294
Cowan Bros., Burwood, N.S.W.	Do.	119	102	68	121	119	127	133	128	123	106	82	64	1,292
Mrs. Sprengel, Coranbong, N.S.W.	Do.	100	119	58	94	126	131	134	123	119	127	82	67	1,280
J. Zahl, Boonah	Do.	74	115	118	116	125	121	130	128	140	120	59	33	1,279
Doyle Bros., Merrylands, N.S.W.	Do.	51	94	102	117	132	132	145	136	130	97	86	43	1,265
T. Fanning, Ashgrove, Brisbane	Do. (No. 1)	0	50	100	125	136	127	148	134	135	128	92	89	1,264
Mrs. Craig, Miriam Vale	Do.	33	88	68	83	126	129	140	141	133	131	104	79	1,255
R. Jobling, Wallsend, N.S.W.	Do.	58	123	91	97	127	120	120	123	115	97	88	63	1,232
J. Archibald, West Maitland, N.S.W.	Do.	21	71	88	84	136	140	154	141	130	92	94	74	1,225
C. Leach, Bexley, N.S.W.	Do.	50	53	63	101	136	131	150	134	135	109	95	61	1,218
J. Murchie, Childers	Brown Leghorns	81	88	31	54	132	141	148	140	138	121	95	49	1,218
J. Gosley, Childers	White Leghorns	63	95	93	118	118	114	115	110	120	99	75	73	1,193
D. Grant, Boonah	Do.	70	92	60	114	129	129	137	123	121	91	69	47	1,182
A. C. Collis, Rookwood, N.S.W.	Do.	47	46	30	69	127	141	150	144	128	110	96	73	1,161
Mrs. Bieber, Childers	Brown Leghorns	65	58	31	51	129	140	147	137	132	104	88	57	1,139
T. Stephens, Blacktown, N.S.W.	White Leghorns	36	64	89	87	126	135	139	113	119	87	68	55	1,118
J. Andersen, Mordialloc, Victoria	Red Sussex	49	68	61	97	118	123	127	114	105	93	90	67	1,112
A. Schbrowski, Childers	Brown Leghorns	37	68	101	100	129	129	129	114	121	77	64	40	1,109
	Totals	2,719	3,871	3,506	4,462	5,345	5,300	5,625	5,285	5,223	4,453	3,643	2,988	52,420

State Farms.

ROMA STATE FARM.

For March, 1914, the Manager reports:—

Meteorology.—Exceptionally warm weather has been experienced for the season of the year, and vegetation of all descriptions has made wonderful growth, in consequence of which a large drain on the moisture contents of the soil has been experienced.

The maximum temperature recorded was 95, average 87·1; the minimum temperature recorded was 51·5, average 66·9; rainfall, 115 points, representing three wet days.

Vineyard.—Operations herein have consisted of one scarifying and one harrowing. The work of chipping portions not capable of being dealt with with horse implements is in progress.

Orchard.—Some of the early oranges and mandarins will probably be fit for marketing towards the close of the month. The lemons responded to the rains of last month better than was anticipated, and a few cases of good quality fruit will be marketed in the course of a few days.

Replants for last season's misses have been received and placed as required in the citrus portion.

The deciduous fruits in most instances have an autumnal appearance.

Olives.—These trees look exceptionally well, and demonstrate that they are sufficiently hardy to prove suitable for planting either for shade or other purposes in this portion of the State. Advantage was taken during the fruiting season to pickle a few of the Piccolina in the green state for show purposes.

Silage Crops.—These have been cut and placed in the galvanised iron lined silo. Only a poor yield of material was obtained. The following crops were placed therein:—5 acres cowpeas, 5 acres maize, 3 acres of sorghum, and 1 acre lucerne.

Teff Grass.—The small area sown in the garden in the early part of the season has been harvested for seed. The plot on the alluvial country, area about 1/16 acre, will be fit for the same purpose within the coming month. All things being equal, a small quantity of seed should be available for distribution next spring. A great drawback in connection with this grass is it liability to lodge; but, should it continue to prove as successful in the future as it has this season—and there does not seem to be any reason why it should not, seeing the number of the same family which thrive here—selection with the object of improving field characteristics could be entered upon.

Rhodes Grass.—This is now fit for cutting with the binder, and will be gone on with as soon as the more important field operations will permit.

Cultural Operations.—The final preparation of the land for 1914 wheat crops is in progress. This work was considerably delayed by silage operations, and it is feared that such will be noticeable in the yields, as the weeds made such progress as to prevent the working of implements which could cover the ground in the shortest time, with the result that the ground had been practically drained of moisture in the surface layers before they could be removed. This only serves to further illustrate, where sheep are not kept, the necessity of turning over the land in the shortest space of time possible to ensure there being sufficient moisture in the soil for the requirements of the subsequent crop.

General.—Between 50 and 60 varieties of grasses have been collected for show purposes.

Orders for seed wheat are not coming in so freely as in previous years, due no doubt to the increase in price and the ability to obtain seed of the varieties offered by us in the district where intending purchasers reside.

Stock have held their own during the month, which is as much as could be expected, notwithstanding the abundance of feed, as the flies by day and mosquitoes at night keep them continually on the move.

NOTES FROM KAMERUNGA STATE NURSERY.

The manager (Mr. C. E. Wood) reports that the rainfall for the month of March was 17.76 in. and the number of wet days 23, making the total rainfall since 1st January 64.68 in. This, taking the average for the previous twenty-one years for the same three months, is this year 13.50 in. over the average.

With regard to growing crops, cowpeas, so far as seed goes, have not been a success, as, owing to the pods ripening during a spell of wet, most of the seed sprouted in the pods.

The few rows of black cowpea have proved a failure, owing to nematode worms attacking the roots, yet other cowpeas within 20 ft. and on the lower side have not suffered. This opens up the possibility that certain cowpeas may be either nematode-resistant or partially so, and the plot with the diseased plants will be prepared and replanted with black and iron cowpea to test the exact superiority, if any, of the iron cowpea as a nematode-resisting variety. With regard to the diseased crop of black cowpeas, these plants were not left on the ground or allowed to mature, but were all dug up with a digging fork, carefully gathered up, and all plants burned while still quite green. By this means a great number of nematodes will have been kept from going back into the ground. The replanting of black cowpeas on the same ground is necessary, as, owing to the diseased plants containing large numbers of worms having been burned, the ensuing crop, no matter how susceptible to the attack of this worm, may prove for the time being to be equally as free as the iron cowpea, even presuming this latter proves resistant to the attacks of nematodes.

Cardomom (*Elettaria cardomom*): The photograph shows a single stool or plant of Cardamom and clearly depicts the manner in which the flowering stems spring from the root stock and lie close along the ground, varying in length from 1 ft. to 2 ft. or more. These plants were put in two years ago, but had it not been possible to supply them with a certain amount of water they would hardly have survived the dry conditions prevailing during a large proportion of the last two years. The Cardamom revels in a good rich soil with plenty of moisture.

PLATE 45.—CARDOMOM PLANT, SHOWING FLOWERING STEMS, AT KAMERUNGA STATE NURSERY.

The fruit now being borne is likely to prove very small owing to the adverse seasons.

A second photograph showing the plants growing under scrub conditions was not suitable for reproduction.

WARREN.

The Acting Manager reports for the month of March:—

Weather Conditions.—The monthly rainfall for March amounted to 432 points, representing twelve falls. On one occasion 100 points fell in twenty minutes, doing much harm to the cultivated areas. We are now in urgent need of more rain.

Cereals.—Fifteen acres have been planted with cereals—namely, Kubanka wheat, Californian feed barley, and Huguenot wheat.

Kubanka.—The seed was excellent in every way, and gave a good germination test. It was planted under good conditions, and germinated well; it is now about 6 in. above ground, and in need of moisture.

Huguenot.—This seed was very pinched, and gave a poor germination test. As a result of this, and on account of its poor stooling nature, it was sown very thickly. It is not showing a good growth, and has germinated very badly.

Californian Feed Barley was planted under ideal conditions, and is now showing a remarkable growth. It was sown fairly thickly, and promises well.

Manchurian Millet.—This crop, although not of any height, has seeded well, and will be reserved for seed.

Maize.—We have four varieties of maize growing, namely:—Boone County White, the best of the four varieties. Has cobbed very well, the grain being full and even in size. A variety well adapted to this district. Johnson County White, a variety imported from America. Has not yet been acclimatised, and has not been a success. Sydney Red has grown well, the cobs being well shaped, with good seed. Early Leaming: This variety has been acclimatised, but the season's crop is not what was at first anticipated. The cobs are few and badly shaped, the grain being pinched.

Lucerne.—The growth of lucerne is remarkable, and a record cutting is expected.

Potatoes.—The potato crop will not be a pronounced success. They have grown very unevenly, and are inclined to run to top. It is yet early to pass judgment on the crop as a whole, although I do not feel optimistic as to the resultant crop.

Sweet potatoes have been planted for pig feed. Practically every cutting has struck, and sufficient winter feed is assurred.

The Orchard.—Five rows of fruit trees have been taken out owing to the unsuitability of the soil. The roots were so firmly embedded in the clay subsoil that a plug of gelignite had to be used to loosen them.

The Dairy.—Dairying proper has now been started on this farm. I am convinced that, provided some grass like Rhodes is grown, dairying in this district will pay handsomely. Our pastures are mostly of Rhodes grass, and the stock are all in excellent condition. We are now supplying cream to the local factory three times a week.

A PERFECT FERTILISER.

Professor Bottomley's discovery of a perfect fertiliser is of intense interest to Australia. He has produced a bacterialised peat, which absorbs the nitrogenous wealth of the atmosphere. The exhaustion of nitrogen by crops is the cause of the decay and death of soils. For soils die just as do all other living elements in nature. They become senile, because of exhaustion. The purpose of fertilisers is to arrest that exhaustion, and to revivify the earth. Rain always brings down large quantities of the free nitrogen of the atmosphere; hence its incalculable value as a revivifier of the land. But much of the nitrogen thus brought down escapes. With a fertiliser such as that now discovered by Professor Bottomley, the nitrogen cannot easily escape before it becomes absorbed by the soil.—Exchange.

The Orchard.

FRUIT CULTURE IN THE BURNETT, GYMPIE, AND MAROOCHY DISTRICTS.

Mr. C. Ross, F.R.H.S., Instructor in Fruit Culture, who has just completed an extended tour through the Burnett district, has furnished the following interesting report on various portions of the district in respect of fruit culture:—

I was fortunate in being able to arrange with five different owners of spring carts to drive me in different directions.

As distances are great and roads rough, it was impossible to visit the Binjour Plateau, Reid's Creek, &c., on this occasion. The journeys were not easy, but a large area of country watered by the Burnett, Boyne, and Auburn Rivers, including the Copeland Group, was traversed. About 25 settlers were visited, to whom instructions and advice were given and gratefully received.

The township is situated on the Burnett River, and surrounded with fine country, where fruit-growing, general farming, and dairying may be profitably carried on, and at present very heavily grassed. The frontages to the abovenamed rivers consist of very deep, sandy, and warpy loams, well suited for the cultivation of all citraceous fruits: lemons may be specialised for the reason that the climate lends itself to the perfect curing and keeping qualities of the fruit. Many of the deep sandy ridges, free from clay, may also be utilised for the same purpose. Away from the box flats the timber is chiefly ironbark, bloodwood, gum, &c. The scrub soils are mostly heavy volcanic loams, better adapted to maize and other farm crops that to fruitgrowing. There is also much land suitable for cotton, lucerne, rosellas, tomatoes, grape vines, and passion fruit, all of which could be made highly remunerative. Strawberries might be enumerated if irrigation were applied, which also applies to garden crops. Apples grow exceedingly well, but crop returns are not likely to be profitable. The number of varieties best adapted for the climate is very restricted; but the following may be grown to a moderate extent for home or local supplies, viz.:—

Greening, Canvade, Rome Beauty, Irish Peach, Jonathan, Ben Davis, with perhaps one or two others.

As a rule, I do not advocate growing any deciduous fruits where such fine opportunities exist for citrus culture. The danger of fruit flies is ever present in mixed orchards. The following, however, not being susceptible to fly attacks, may be grown with good results, viz.:— For damp situations: Walnut, Chestnut, and Date Palm. For drier situations: Pistachio Nuts, Almonds, Persimmons, Figs, Loganberry, Mul-

berry, Pecan Nut, Olive, and Cooking Pears. Avoid Guavas and all stone fruits where oranges are intended to be the main source of income.

Those who have already gone to the expense of preparing the land, and planted with trees, should immediately equip themselves with either a spraying or a fumigating outfit—*i.e.*, a spray pump or a few cyanide sheets. The district is now clean, and by proper attention it may be kept so. The citrus trees especially should be sprayed or fumigated at least once a year, beginning the first season whether there is any pest visible or not. If these operations are carried out in routine order, the same as cultivation and pruning must be, the expense and loss of time are reduced to a minimum; whereas, if pests are allowed to accumulate, it is always difficult to eradicate them and, in some cases, well nigh impossible.

My thanks the due to Mr. W. G. Parker, Secretary of the Mundubbera Farmers' Association, for kind attention; to Messrs. E. M. Berbe, Wm. McLennon, and H. V. Carmen for long drives; and Messrs. Jas. Nattrass and Salmi for shorter ones.

On returning to Gayndah, Mr. Geoffrey White drove me to his Glenora Orangery. This is an old and very notable orchard, planted over thirty years ago by Mr. Seeney; but the present owner has recently planted another 1,000 trees. The bearing trees are exceedingly fine examples of what can be done on these Burnett River lands; they are upwards of 30 ft. in height and 20 ft. in diameter. Oranges, mandarins, and lemons are carrying fine crops. The trees, both young and old, are remarkably vigorous and clean. On the largest trees a little scale is showing, and, as it is impracticable to fumigate such large trees, they should be sprayed at once after the crop is off. It is also desirable—in fact, important—that the young trees, although showing no sign of pests at present, should be regularly fumigated once a year. On the whole, this is one of the best-managed, cleanest, and best-cultivated orangeries I have seen.

I also visited Mr. Ben Nixon's Orangery. As regards cultivation and vigour of trees, the same remarks apply. About 200 trees grafted on lemon stocks are now coming into full profit. The selection of varieties is good. Scales have obtained a considerable hold, and fumigation operations should be the first order of the day—first, immediately after the crop is gathered; and again in spring, just after blossoming.

Both Mr. White and Mr. Nixon have wisely discarded all deciduous tree fruits.

I arrived at Gympie at midnight of the 13th idem. Early the following morning I was driven to Eel Creek and Pie Creek, and visited a number of settlers. I noticed sandstone ridges, well above frost line, on which for the cultivation of pineapples the soil is characteristic, and as suitable as that of Woombye. There are also slopes and plateaux of deep, sandy volcanic loams, and well-drained flats of a slightly heavier character, that would suit oranges, papaws, and passion fruit. Pines, &c., should be devoted to the slopes, away from the flats.

Pests have been allowed to accumulate to a serious extent. One very noticeable object lesson was pointed out where the relics of an old orchard, dying from neglect and disease, had communicated scale pests to a three-year-old plantation near by, causing the young trees to die already. The method of pruning to adopt was demonstrated, to be followed by cyaniding or spraying. By timely application of the instructions given, the pests will soon be eradicated. A yearly or a bi-yearly treatment, whether the pest is present or not, should not be neglected.

Much expense is required to establish these plantations, and it is very regrettable to notice, in some instances, how sadly neglected they become, regarding both cultivation and pests. The spray pump or cyanide sheets are just as necessary to the orange-grower as are the plough, the hoe, and the pruning knife.

I visited a very fine orchard site well up a gently sloping spur at Amamoor. Twenty-five acres have been cleared of dense jungle on an easterly aspect, from which is commanded a grand panoramic scene. The soil is a deep, rich, friable, volcanic loam, and as for quality, aspect, and situation it cannot be excelled. About 10 acres of bananas are now producing mother bunches averaging 10 dozen each, which, for a first produce, is considered good in the most ideal situations. The five-months old pineapple patch has made remarkable progress. Land is now being prepared for the reception of citrus trees. Papaws can be well grown, and, amongst other things, custard apples are recommended for this mountain range.

On a previous visit to Woondun I had recommended a site for bananas in the midst of dense, heavy forest. The initial cost on such country is very heavy, but, in my opinion, it is justified by the site and quality of soil. The character of the soil is similar to that of Takura and Nikenbah—a metamorphic limestone, which suits the banana to perfection. The aspect is easterly, and extends along the face of a spur which is to be planted quite up to the top of that part of the range. The west face is more abrupt, but, as it is well sheltered by other ranges and high dense forest, a few more chains in width could be utilised for citrus fruits and bananas. The quality of oranges grown on such country is first-class, and the skins are usually very thin. Five acres of bananas have just been planted, but being late in the season are not likely to make much growth before next October.

On the Friday I was driven to Goomboorian over the roughest and, in places, the most dangerous road in all my experience.

At Mr. Austin's farm the situation for a banana plantation is ideal, being planted on the slopes and surrounded by an arrangement of mountains that give one the idea of the trees being perfectly sheltered from high winds from any point. The bananas have been planted about sixteen months, and are now bearing mother bunches. The plants are luxuriant, except in one small patch, where I imagine a bar of impervious

subsoil or rock approaches too near the surface. The application of explosives would no doubt improve its condition.

My former opinion of the country surrounding Gympie has been abundantly confirmed during this visit. There is no lack of choice regarding situations, aspects, quality, and variety of soils adapted to a wide range of field, garden, and orchard subjects.

I afterwards visited Maroochy, *viâ* Yandina, where I met and discussed fruit matters with several growers along the river. I do not remember ever seeing bananas more at home than in these river pockets. I saw seven-months old plants bearing their first bunches, and other stools under twelve months old that had produced six and seven remarkably robust, full-grown stems, some of which are throwing out bunches. Such a number of stems of enormous growth seems to knock one's calculations awry in connection with such young plants, when from three to five stems are usually considered sufficient for two-year-old stools.

In this instance, however, the end appears to justify the means. Whilst the Maroochy appears to be the home of the banana, oranges may be successfully cultivated on a few of the well-drained ridges, where there is no suspicion of a clay subsoil. The quality and keeping properties, however, may not be equal to the best citrus localities. Pineapples in suitable spots may be grown also, but the same remarks apply. The fruit would be watery and never develop the full rich flavour of more congenial localities.

I have to thank the following gentlemen for drives and courtesies, viz.:—Messrs. W. Sinclair, V. T. Pittel, A. Henderson, J. Cullinane, Mellor, T. Connor, Maynard, and A. C. Potter.

An addendum to the above has just been handed to us by Mr. Ross to the following effect:—

I have repeatedly recommended the more serious consideration of lemon culture in such localities as are suited to this product and, to further accentuate its importance, I quote a few figures just to hand of a recent consignment from Bowen to Sydney. The agent handling the shipment—a fairly large one—reports that the fruit arrived in excellent condition, and was equal in every way to the best imported Italian lemons, and realised 14s. per case containing 10 to 12 dozen. Washington Navel oranges, also from the Don Delta Groves (Messrs. Cotton and Adams), realised 2d. per orange *net*.

During my recent visit to Gympie I was shown the accounts of a consignment of seventeen cases of locally-grown pineapples just sold in the wholesale markets of Sydney which returned exactly 1s. per pine *net*. The pines grown in this district have good carrying qualities. The best districts for lemon culture are—The Don Delta, Burnett, the Central, west of Rockhampton, Toowoomba, and the West.

TWIN PINEAPPLES.

The two fine smooth-leaf pineapples here illustrated were grown on Mr. R. Morris's pineapple farm at Ormiston. These pines cannot be classed under the head of freaks, both being well-grown marketable fruits. Twin pineapples growing on the same sucker have been produced in North Queensland, and invariably from the smooth-leaf variety, none having been observed in the Ripleys or other rough-leaf pines.

PLATE 46.—TWIN PINEAPPLES ON ONE STALK.

Tropical Industries.

NOTES ON DATE-GROWING—IV.

[CONTINUED FROM APRIL ISSUE.]

CARE OF ADULT TREES.

Old Leaves Cut Away and Bases of Trees Cleared of Excess of Off-Shoots and Rubbish.—Adult trees require very little care or attention. Mr. Gaskin, Assistant for Commerce and Trade, Bagdad, informs me that the Arabs there prune the dead leaves from the palms three times a year—viz., (*a*) at the time of pollination; (*b*) when the fruit is well formed, but has not turned yellow; and (*c*) when the bunches of fruit are finally cut down. In many places where the date is cultivated, however, pruning is only done once a year. In spring, when growth commences, the leaves which are withering up and hanging limply, are cut away, and the bases of the trees are cleared of all rubbish and superfluous off-shoots. Four to six off-shoots are usually left on each tree to provide young plants for planting elsewhere. Off-shoots while attached to the parent tree obtain all their nourishment from the parent; therefore, the crop of fruit is diminished if a large number of off-shoots are allowed to remain attached to the tree. If a tree bears specially good fruit, and off-shoots from it are much wanted, a larger number of these may be allowed to grow at the base.

Ages between which Trees Produce Off-shoots.—Date trees usually produce off-shoots between the ages of five and twenty years. After twenty years of age, few or no off-shoots are produced. Young date plants grown from seed which have dropped around the trees, and all other useless plants growing around the bases of the trees, should be removed, as they take up water and food materials from the soil, which would otherwise have been available to the date trees.

Water Requirements of Adult Trees.—This has already been explained at length. No general rule can be given with regard to the amount of water to be applied artificially. It is, however, agreed that the palm requires more water in the fruit-developing period than it does at other times of the year. About three-fourths of the total number of waterings given in a year are usually applied in that period. If, therefore, sixteen waterings are given per annum, twelve of them would be given here between the 1st of May and the end of August approximately.

Excess of Water Injurious at Flowering Time.—At the flowering time, little or no water should be given as a general rule, as it is believed that an excess of water at this time prevents the proper setting of the fruit. Adult date palms may have the bases of their stems flooded for considerable periods without harm. In parts of Egypt water to a depth of from 3 to 4 ft. stands round the trees during September and October every year. Flooding will, however, kill newly-planted off-shoots by destroying their terminal buds if the water covers them for any length of time.

Cultivation of the Soil between the Trees where no Crops are Grown.—If no crops are grown between the trees, it would still be an advantage to irrigate the whole of the land and plough, harrow, or otherwise stir its surface up occasionally. The occasional irrigations would prevent alkali collecting in great strength on the surface of the land and washing it down and redistributing it in the soil; and the ploughings or harrowings would eradicate weeds and retard evaporation. (For crops grown between the trees see Part 3, in April issue of the Journal, under the head of "Auxiliary Crops.") Other attentions required are pollination of the flowers, thinning down the number of bunches of fruit, and protection of the fruits. These will be dealt with further on.

THE DIFFERENCES BETWEEN MALE AND FEMALE TREES.

Difference between Male and Female Suckers.—In purchasing suckers (off-shoots) one may be supplied with (1) male off-shoots, (2) female off-shoots from inferior varieties of trees, (3) seedling plants, in place of good female suckers.

Male trees have usually more thorny and stiffer leaflets than females, and every variety of female date plant differs to a greater or less extent in these respects from every other variety. Differences of this sort between females are fairly constant, as the particular varieties are propagated by off-shoots, but they are often very slight. Male trees are usually propagated by seeds; therefore, these characters differ considerably in males. To distinguish date suckers by their leaves and spines, therefore, is a difficult task. Only people who are very intimately acquainted with the date palms of a locality can hope to identify the cultivated varieties by these means, and very often even they fail to do so. The lower end of an off-shoot has a mark showing where it has been severed from its parent, while the lower end of a seedling has no such mark normally. Fraudulent people, however, very often cut a piece off the lower end of a seedling to make it appear like an off-shoot. A seedling plant usually has a straight stem, however; while that of an off-shoot usually has a slight bend at its base, where it curves inwards to join the parent stem. The direction of the cut with regard to the main axis of the plant and the angle at which it cuts the cap-conducting vessels of the wood also usually differ in the two cases. In the case of the off-shoot, the cut is made approximately in the plane of the main axis of the plant, and, owing to the base of its stem bending towards its mother, the cut will be more or less at right angles to the direction of the vessel at that point. In the seedling, if the cut is made at right angles to the direction of the vessels, it will be at right angles to the main axis of the plant; and if it is cut in a plane anywhere approaching that of the main axis of the plant, it will not be in the proper direction with regard to the vessels, and the cut end will probably show a more or less distinctive outline. Male off-shoots, female off-shoots from inferior trees, and seedling plants, if skilfully cut, are all extremely difficult to distinguish, even by the most experienced people; and as the trees will only be distinguished with certainty when they begin to bear flowers and fruits, five to ten years afterwards, I strongly advise that, where possible, the

parent trees be marked when in fruit, and that the suckers be detached from their parents at the planting season under personal or reliable supervision.

Differences between Adult Male and Female Trees not in Flower.—Adult male trees, in addition to having more spiny leaves and stiffer leaflets, are said to have shorter stems and more leaves on their tops as a rule. Differences in thickness of stem and in the crown of leaves at the top of the trees are, however, less reliable than the other differences mentioned. Very frequently parts of old flower clusters remain attached to the tree after the flowering and fruiting seasons are over, and in such cases the sex of the tree can often be identified.

The Inflorescence of Flower Cluster.—In spring a number of structures, at first greenish, and later brown, and measuring 3 to 5 in. across, and 1 ft. or more in length, make their appearance at the bases of the leaves which crown the palm. These structures are called "spathes," and each spathe encloses a cluster of flowers. When the spathe has become brown in colour, and has attained something like the size mentioned above, it splits open and exposes the cluster of flowers which it contains (photos. Nos. 2 and 3). Each flower cluster consists

PLATE 47.

A—Inflorescence showing the dark-brown spathe just splitting open and showing the male flowers which it contains.

B—Male inflorescence free from the brown spathe.

C—A past year's male inflorescence showing the comparatively short lateral branches crowded near the top of the main axis.

of a central stem with 100 or more branches radiating from near its end. Each one of these small branches carries on it a large number of tiny flowers, as shown in sketches A, B, C, and D, and photos. Nos. 2 and 3.

The Male Flower Cluster.—The small branches on the male flower cluster are about 6 in. long; and if the cluster is shaken about the time that the spathe splits open, a dense cloud of yellowish pollen dust will fall from it.

On examination, it will be seen that in every little flower there are six stamens standing up like little pillars, each composed of two little yellowish pollen sacs, and that it was the contents of these that formed the cloud of pollen dust. Around the six little pillar-like stamens are

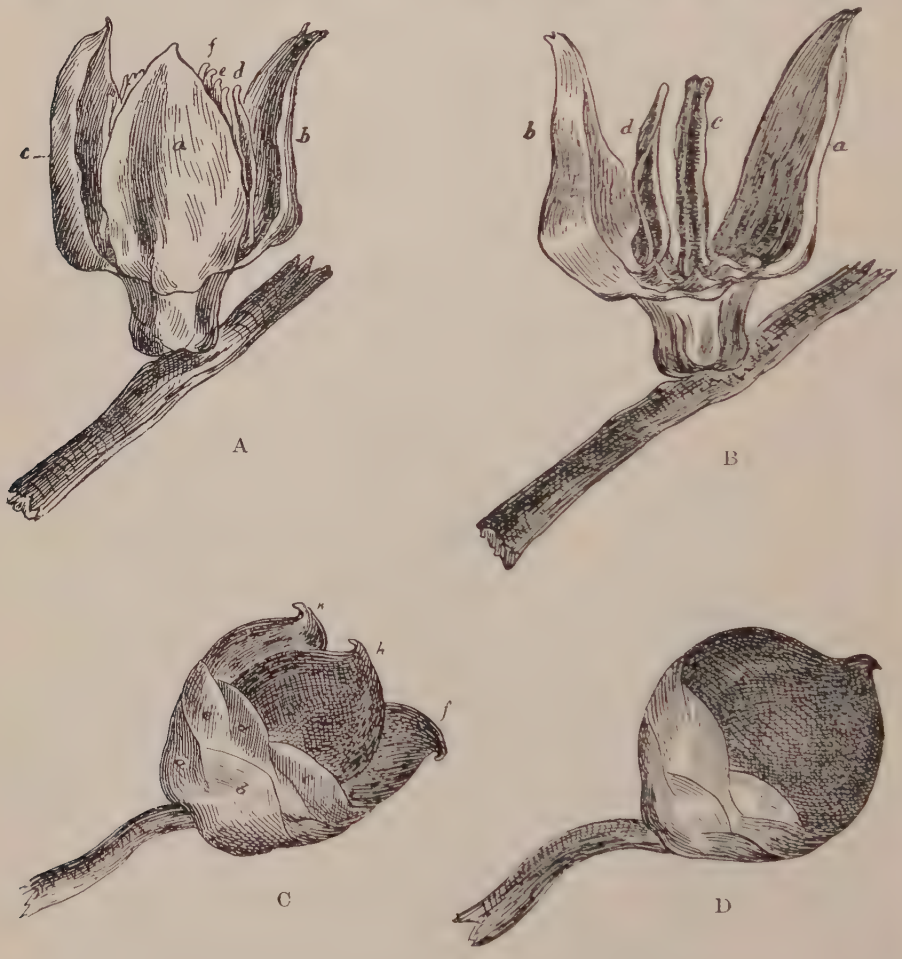

PLATE 48.

SKETCH A.—Male Flower—Scales (Sepals and Petals), *a*, *b*, and *c*; Stamens, *d*, *e*, *f*, &c.

SKETCH B.—Part of Male Flower—Scales, *a* and *b*; Stamens, *c* and *d*.

SKETCH C.—Female Flower—Scales (Sepals and Petals), *a*, *b*, *c*, *d*, *e*; Carpels, *f*, *h*, *k*.

SKETCH D.—Female Flower after two of the carpels have been shed. The single remaining carpel will form the date fruit.

(Four-fifths actual size.)

six waxy-looking, little, scale-like structures which represent the sepals and petals in familiar flowers. These scales close over and protect the stamens until the pollen sacs have matured their pollen grains, and are ready to burst and set the pollen free (photos. 2 and 4, and sketches A and B.) Very soon after the large brown spathe splits open, the scales (sepals and petals) which covered and protected the stamens open out, and the pollen sacs burst. The opening of the scales and the bursting of the pollen sacs are due to the cells of their outer or epidermal tissues drying and contracting under the heat of the sun. The pollen sacs usually open within an hour or two of the bursting of the spathe.

Female Flower Cluster (See photo. No. 5).—The spathe which encloses the female flower cluster is very similar to that which encloses the male cluster, and it bursts in the same way when the female cluster is ready for fertilisation. The small branches of it are, however, less confined to the end of its main axis, and are very much longer than the small branches in the male flowers cluster (see photos. Nos. 2 and 3). The female flower also differs very much from the male flower (see sketches A and C). It is an oval-looking body, and might at first be mistaken for a male flower in which the white scales (petals and sepals) had not opened out. On dissecting it, however, it will be found that the central and main part of the flower is formed of three solid bodies, closely applied to each other on their adjacent faces, and forming what appeared like one oval body. Each of these solid bodies is called a carpel, and contains a structure called an ovule, which, when fertilised by the pollen, gives rise to a seed, the carpel giving rise to the edible part of the fruit at the same time.

PLATE 49.—THREE SMALL BRANCHES OF MALE FLOWERS.

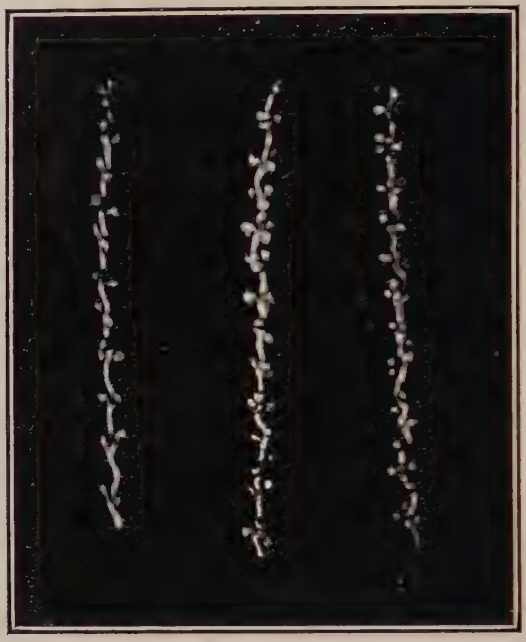

PLATE 50.—THREE SMALL BRANCHES OF FEMALE FLOWERS.

At the bases of the three carpels are six scale-like structures similar to the protecting scaly sepals and petals found in the male flower, but very much smaller and clinging closely to the carpels. A mass of female flowers, therefore, never has the very waxy white appearance which a mass of open male flowers has.

Brief Comparison of Male and Female Flower Clusters (Photos. Nos. 2, 3, 4, 5).—At a distance, therefore, the flower clusters may be distinguished by the fact that the small branches in the male cluster are about 6 in. long and densely clustered at the end of the axis, while those of the female are usually twice or more times that length, and less densely clustered at the end of the axis. When the flowers newly open, they may be distinguished at a distance by the white, waxy colour of the male flowers, and the more yellowish hue and less crowded appearance of the female flowers. If taken in the hand at this stage, a dense cloud of pollen dust will be produced from the male cluster by a slight shake, while none will come from the female cluster; also, six stamens with six comparatively large waxy-looking scales will constitute each male flower; while the female flower will be composed of three carpels closely applied to each other, and forming what looks like a single solid oval body, and having six very tiny scales closely applied to its base. The flower clusters can also be distinguished at that stage by their smell.

Monœcious Trees.—The above is the usual condition of affairs, but last date-flowering season I found a considerable number of trees in which one of the flower clusters was mostly composed of male flowers, while another flower cluster from the same tree was mostly composed of female flowers. When the sexes are in separate flowers, but on the same tree, the tree is said to me monœcious.

Hermaphrodite Flowers.—In other cases I found three more or less functional carpels and two to six more or less functional stamens in the same flower—*i.e.*, both sexes in the same flower. Where both sexes are in the same flower, the latter is said to be hermaphrodite. In the cases

PLATE 51.

A—Dark-brown spathe just splitting open and showing the female flowers which it contains.

B—Female inflorescence free from the spathe.

C—A past year's female inflorescence showing the comparatively long lateral branches less crowded on the top of the main axis than in the case of the male inflorescence.

when the flowers were hermaphrodite the small branches of the flower clusters were midway in length between those of the ordinary male and ordinary female cluster. Other characters which can be detected at a distance were also rather mixed.

[TO BE CONTINUED.]

COTTON AT GOSSYPIUM PARK, CAIRNS DISTRICT.

BY HOWARD NEWPORT, Instructor in Tropical Agriculture.

In continuation of his article on Cotton-ginning, &c., in North Queensland, published in the April issue of this Journal, Mr. Newport now gives some account of

THE USES AND TREATMENT OF COTTON SEED IN NORTH QUEENSLAND.

The seed of cotton after it leaves the cotton gin is by no means perfectly clean. The best of gins cannot separate all the lint, and, whatever the seed may be used for, a further cleaning is necessary. In large factories or oil-crushing mills a special machine is kept for the purpose, called a "linter," by which the small particles of cotton adhering to the seed are removed.

When required for crushing for cotton-seed oil, it may be put into the press as it is, or more often is redried, cleaned, and put through a hulling machine, which removes the outer black shell or putamen. The resulting meat or pure kernels of the seed give a higher percentage of oil of a purer and better quality than if the seed were crushed whole. Cotton-seed oil cake is one of the most valuable of cattle foods, and considered second only to cocoanut oil cake. The black husks are also used as cattle food in some countries, and are said to have a fairly high feed value. It is mixed with other foods, such as bran and pollard, for milch cows in Ceylon and India.

The return of oil is about 2 gallons for every 1 cwt. of seed crushed, but considerable power is required, as it is often necessary to obtain a pressure of 4,000 lb. to the square inch to obtain a satisfactory extraction. To do this, of course, hydraulic presses are necessary, and the primitive methods of wooden screw and rotary presses, especially if the seed is crushed without shelling, give a very much poorer extraction and would hardly be worth while troubling about in this country.

The crude oil is quoted now in London at £30 5s. per ton, and refined at £33 to £33 10s. per ton; while the oil cake of pure meat is worth about £8 per ton wholesale, and £10 or over retail. The coarse oil cake from the unshelled seed is seldom met with now, and it is not worth so much, though said to be somewhat higher in feed value.

The disintegrated oil cake is also a valuable manure, and is known in India as "poonac." There it is used to add bulk to artificial or chemical manures, and materially assists in the mechanical effects on the soil, besides having a high manurial value itself on account of the percentage of nitrogen contained.

The analysis of cotton cake or meal (disintegrated cake or poonac) is given by L. T. Addyman, B.Sc., London, as—

Moisture	10·81
Organic matter	82·49
Calcic phosphate	5·55
Alkalis	·55
Sand	·65

No crushing plant exists in North Queensland, which is a pity, as a press that could produce a ton of oil a day would only cost about £100, and could be used for many other oil-producing seeds and products besides cotton seed. As it is, this seed being worth only some £4 a ton, and freight being charged by measurement, there is scarcely sufficient margin to make it worth while shipping it to the Southern oil factories.

While the oil is valuable if extracted, its presence does not, however, reduce the value of the seed for either cattle food or manure. When the unpressed seed is so used, it is best crushed or broken, which can be readily done in almost any crushing machine. This has been done by the Director of the Gossypium Park Estates Company at Kamma, and excellent results obtained with the substance both as cattle food and as manure for cotton, cane, and other agricultural staples.

Plate 52 (Fig. 1). Crushed Cotton Seed (Unpressed) for Fodder or Manure.

Fig. 1 shows some of the cotton seed crushed (without the oil being abstracted), and in a form in which it can be used either as stock food or manure. When used as stock food, it is in this country mixed with chaff or "chop-chop," as is maize. In some instances, as indeed with grass-fed animals first fed with maize or silage, stock are shy of it until they become accustomed to the taste, but, once used to it, they eat it greedily with, in every way, excellent results. As a fodder, crushed cotton seed is worth about £15 a ton.

When prepared for manure only, the seed need not be so carefully cleaned as for feed, since the presence of sticks, sand, or dust to a small percentage does not matter. When used manurially, it may be mixed safely with most artificial manures, which may be done with the aid of a manure-mixing machine such as is depicted in the background of Fig. 1.

For purposes of propagation, the seed as it leaves the cotton gin requires considerable treatment. In the absence of a delinting gin, the seed must be put through a coarse wire sieve. When shaken lightly in this, the seed that has but little adhering lint is found to readily pass through and separate from the seed carrying lint, especially in the case of the Sea Island types of cotton, such as Caravonica, one of the characteristics of which is the clean skin of the seed except for a small tuft at the end. The cotton seed dealt with in the Northern parts of Queensland is practically all of this type. The first sieving process is found to produce from 40 to 60 per cent. of seed fairly free from linters. This seed, however, still includes the broken, discoloured, light or shrunken and malformed seeds which, though not worth while separating for pressing for oil or crushing for food or manure, are largely non-fertile and must be removed to obtain a sample of seed of a good

PLATE 53 (FIG. 2).—"GARBLING" COTTON SEED FOR PROPAGATION AT GOSSYPIUM PARK ESTATE, KAMMA.

percentage of germination and true to type. This can only be done by hand, for no machine can separate seeds that may differ only in colour. The process of removing the irregular seed is, therefore, the slowest and most expensive. Fig. 2 illustrates this process, which is technically known as "garbling," being carried out on the Gossypium Park Estates by aboriginal children under the supervision of the Director, Mr. J. Campbell.

Each of the varieties of cotton, especially the Sea Island types, have their own characteristics in the seed which are well known to the growers. In the case of Caravonica, any of the employees could pick out a typical seed at a glance; and the seed being spread out on a table, and being mostly pure, the aboriginals with their sharp eyes can detect and pick out all the seed that do not conform to the type, far more quickly

than could a white person unless trained to the work. All the irregular seed, including the shrivelled, light-coloured (and generally hollow), and malformed seed, of which a percentage must always be found, are thus removed, and, after a final sieving in a fine sieve to remove sand and dust, the seed is ready for distribution to intending growers. This process is found to cost about 6d. per lb.; and while the seed of this valuable variety of cotton is disposed of, and may be obtained through the Department, from the cotton sent in by growers for treatment and realisation by the Government, at 1s. per lb. in the crude state—*i.e.*, just as it leaves the cotton gin—it is always advisable to obtain the properly selected and treated seed, which is available in fair quantity now at 2s. per lb.

A NEW EGYPTIAN COTTON PLANT.

According to the "Egyptian Gazette," "an extraordinary fine Egyptian cotton has recently been produced by careful selection on the estate of Mr. Pangalo at Mit Ghamr, in the Dakhalieh Province. We have examined a number of samples of this new variety, which is brown in colour and most silky in texture. The staple is probably the strongest of all varieties of cotton in this country, and one of the most characteristic features of the plant is its shortness, but the plant is covered with bolls, over 100 bolls having been found on a single plant. The return of cotton from this variety per feddan is higher than that of any other variety of cotton in Egypt yet, for sowing one feddan needs only four 'keles,' instead of six or seven 'keles,' as is the case with other varieties. Its other advantages are that it arrives at maturity very rapidly, and consequently is the less liable to the attacks of cotton pests, changes in the weather, and all other ills to which Egyptian cotton is subject. Some specimens are to be sent to the International Cotton Exhibition, which is to be opened in London during the coming summer. Messrs. Choremi Benachi and Co. have obtained the monopoly of this new variety. The seed of the Pangalo cotton is only sold by this firm and Messrs Pangalo on the condition that the crop is sold back to them, thus preventing the seed getting into the hands of outsiders. This year 2,000 ardebs have been produced, but, of course, the yield next season will be very much greater."—"Rubber World."

RAMIE.

Although ramie will thrive splendidly on our coast lands, and although the present price of the valuable fibre it produces is from £48 to £50 per ton, there is no inducement to grow the plant here, owing to there being, we understand, no machinery yet devised capable of extracting the fibre profitably. Various machines for the purpose have been invented, and numerous trials have been made with them, but, from all accounts, they have failed to fulfil the requirements. Thus ramie fibre

still remains in the category of fibres which must be prepared by hand in lands of cheap labour.

The "Cyprus Journal," some time ago, published some particulars of the cultivation of ramie by Commander Richard Nivison, R.N.R., at Kyambu, near Nairobi, British East Africa, where that gentleman has been growing ramie for five or six years. In a letter to the "African Standard," of Nairobi, he says that, "without any machine or process for decorticating the fibre, ramie can be grown for export at a handsome profit on suitable land in the colony, the ribbons being stripped from the stems by native hand labour, which is readily obtainable. The ribbons fetch from £12 to £14 per ton in the London market, and Mr. Nivison says that the yield per acre is nearly 4 tons of dry ribbons in the second year and over 5 tons in the third year and for at least seven years afterwards, with sufficient manure. Allowing for the cost of labour, manure, freight to London, and incidental charges, Mr. Nivison says that the profit is at least £10 per acre the third year, and £14 thereafter. All the machinery required is a press. Experiments already made show that ramie will grow on irrigable land in Cyprus."

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1914.

Date.	MAY.		JUNE.		JULY.		AUGUST.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·13	5·17	6·30	5·0	6·39	5·3	6·30	5·18
2	6·14	5·16	6 30	5 0	6 39	5·4	6 30	5·18
3	6·14	5·15	6·31	5·0	6·39	5·4	6·29	5·19
4	6·15	5 14	6 31	5·0	6·39	5·4	6·28	5·19
5	6·15	5·13	6·32	5·0	6·39	5 5	6 28	5·20
6	5·16	5·13	6·32	5 0	6·39	5·5	6 27	5·21
7	6·16	5·12	6·33	5·0	6·39	5·6	6·26	5·21
8	6·17	5·11	6·33	5·0	6·39	5 6	6·26	5·22
9	6·17	5·11	6·34	5 0	6·39	5·6	6·25	5 22
10	6·18	5·10	6·34	4·59	6·39	5·7	6·24	5·23
11	6·19	5·9	6 34	4·59	6·39	5 7	6 23	5·23
12	6·19	5 9	6 35	4·59	6·39	5·8	6·22	5·24
13	6 20	5·8	6 35	4·59	6·38	5·8	6 22	5·24
14	6 20	5 8	6·36	4 59	6 38	5·9	6·21	5·25
15	6·21	5·7	6·36	4·59	6·38	5·9	6·20	5·25
16	6·21	5·6	6·36	5·0	6·38	5·10	6·19	5·26
17	6·22	5·6	6·37	5·0	6 37	5·10	6 18	5 26
18	6 23	5·5	6·37	5·0	6·37	5·11	6·17	5·27
19	6 23	5·5	6 37	5·0	6 37	5·11	6·16	5·27
20	6·24	5·4	6·37	5·0	6 36	5·12	6·15	5·28
21	6·24	5·4	6·38	5 0	6 36	5·12	6·14	5 28
22	6·25	5 3	6·38	5·1	6 36	5·13	6·14	5·29
23	6 25	5 3	6·38	5·1	6 35	5·13	6·13	5·29
24	6·26	5·3	6·38	5·1	6·35	5·14	6 12	5·30
25	6·26	5 2	6·39	5·1	6 34	5·14	6·11	5·30
26	6·27	5·2	6·39	5·2	6·34	5·15	6·10	5·31
27	6 27	5·2	6 39	5·2	6·33	5·15	6·9	5·31
28	6·28	5·1	6 39	5·2	6 33	5·16	6·8	5·31
29	6·28	5·1	6 39	5·2	6·32	5 16	6·7	5·32
30	6·29	5·1	6 39	5·3	6·32	5·17	6 5	5·32
31	6·29	5·0	...	...	6·31	5·17	6·4	5·33

PHASES OF THE MOON.

			H.	M.	
3 May	☾	First Quarter	4	29	p.m.
10 „	○	Full Moon	7	31	a.m.
17 „	☽	Last Quarter	8	12	„
25 „	●	New Moon	12	35	p.m.
2 June	☾	First Quarter	12	3	a.m.
8 „	○	Full Moon	3	18	p.m.
16 „	☽	Last Quarter	12	20	a.m.
24 „	●	New Moon	1	33	„
1 July	☾	First Quarter	5	24	a.m.
8 „	○	Full Moon	12	0	„
15 „	☽	Last Quarter	5	32	p.m.
23 „	●	New Moon	12	38	„
30 „	☾	First Quarter	9	51	a.m.
6 Aug.	○	Full Moon	10	41	a.m.
14 „	☽	Last Quarter	10	56	„
21 „	●	New Moon	10	26	p.m.
28 „	☾	First Quarter	2	52	„

Vegetable Pathology.

A GUMMING DISEASE AFFECTING LEMON FRUITS.

REPORT BY E. JARVIS, Assistant Government Entomologist.

In his report to the Under Secretary for Agriculture and Stock (31st March) on the above subject, Mr. Jarvis gives the result of an investigation of a disease affecting lemons on Mr. W. Horacek's selection at Brookfield, conducted on the 5th March.

The malady (he says) is of a serious nature, and occasions the loss of about 50 per cent. of fruit.

Mr. Horacek purchased his stock in 1906 from nurserymen in New South Wales and Queensland, procuring 300 trees from the former State and 200 locally.

These trees (which comprise the varieties "Villa Franca," "Genoa," and "Lisbon") are worked on rough lemon and mandarin orange stocks, and planted 25 ft. by 30 ft. on a steep hillside with a north-easterly aspect, the soil being red volcanic resting on a subsoil containing ironstone.

Four years after planting, when harvesting his first crop, Mr. Horacek noticed that a number of lemons were diseased, but attributed it to the trees being young, and trusted that the trouble would disappear in time.

He tells me that they have never shown indications of suffering from want of moisture, and at present they certainly look remarkably well and are making good growth.

Injurious Symptoms.

Apparently these are confined exclusively to the fruit, which, to an ordinary observer, appears healthy, but when examined is seen to be more or less diseased internally.

(1) External—

Lemons affected with this disease lose their brightness, and the skin assumes a peculiar dead look, the green surface of the peel appearing almost whitish in certain lights.

There is no conspicuous discoloration of the stem-end or any other portion, but such fruit is usually undersized and ripens prematurely.

(2) Internal—

Early Stages. If one of these lemons be cut in half, the peel will be found discoloured in places with pale brownish-yellow more or less cloudy-looking blotches or darker brown markings, which, in some instances, extend into the fruit pulp.

Advanced Stage.—Later on, the central core may be dark brown in colour (very noticeable when a fruit is cut down the middle lengthwise), or this central space may be filled with a transparent pale-yellow or white jelly, a thin layer of which also surrounds the pips. Occasionally a portion of peel next the fruit pulp breaks down into a gelatinous, rather sticky, dark brown fluid of the consistency of thick treacle, occurring generally in the form of an irregular patch of about the size of a penny, and very conspicuous when a lemon is cut in half transversely.

Final Stage.—This condition is very similar to the preceding, but further characterised by an abnormal dryness and more general discoloration of the internal tissue, and by the fruit assuming a faint yellow tinge and falling from the trees.

Cause of the Disease.

The absence of injurious insects or fungi likely to be implicated, and the fact that all trees examined appeared perfectly normal and vigorous, inclined me at first to imagine this disease to be entirely physiological in nature, and most likely due to unfavourable local conditions associated with adverse climatic influences—a supposition which seemed feasible in the light of the following additional evidence derived from personal observations:—

(1) The disease is of regular annual occurrence.

(2) It is invariably worse during late summer and autumn than at other seasons. [*Note.*—Mr. Horacek's main crop of lemons which sets about Christmas time is always far more "jellified" than the late crop, which sets in May and is harvested in November.]

(3) It occurs on different classes of soil.

(4) It is not confined to any particular variety of lemon, but affects all three of the above-mentioned kinds, leaving, as a rule, about the same percentage of good fruit on each.

(5) It attacks trees worked on different stocks.

I am glad to report, however, that Mr. C. J. Pound (Government Bacteriologist), to whom I submitted a diseased lemon for examination, has observed swarms of bacilli in the fruit gum, so that, strictly speaking, the disease under discussion must be provisionally regarded as bacterial, although at the same time other important factors—included under such headings as locality, soil, drainage, &c.—probably favour its appearance.

I may mention here that some lemons planted by Mr. S. C. Voller, at Enoggera, on granitic soil developed this fruit affection as soon as they came into proper bearing, but, curiously enough, the trouble did not appear on trees growing less than a mile away, at "Glen Retreat," where the soil was similar, but of greater depth.

Mr. Voller has noticed, too, that lemons on Macleay Island, near Cleveland, are subject to this disease.

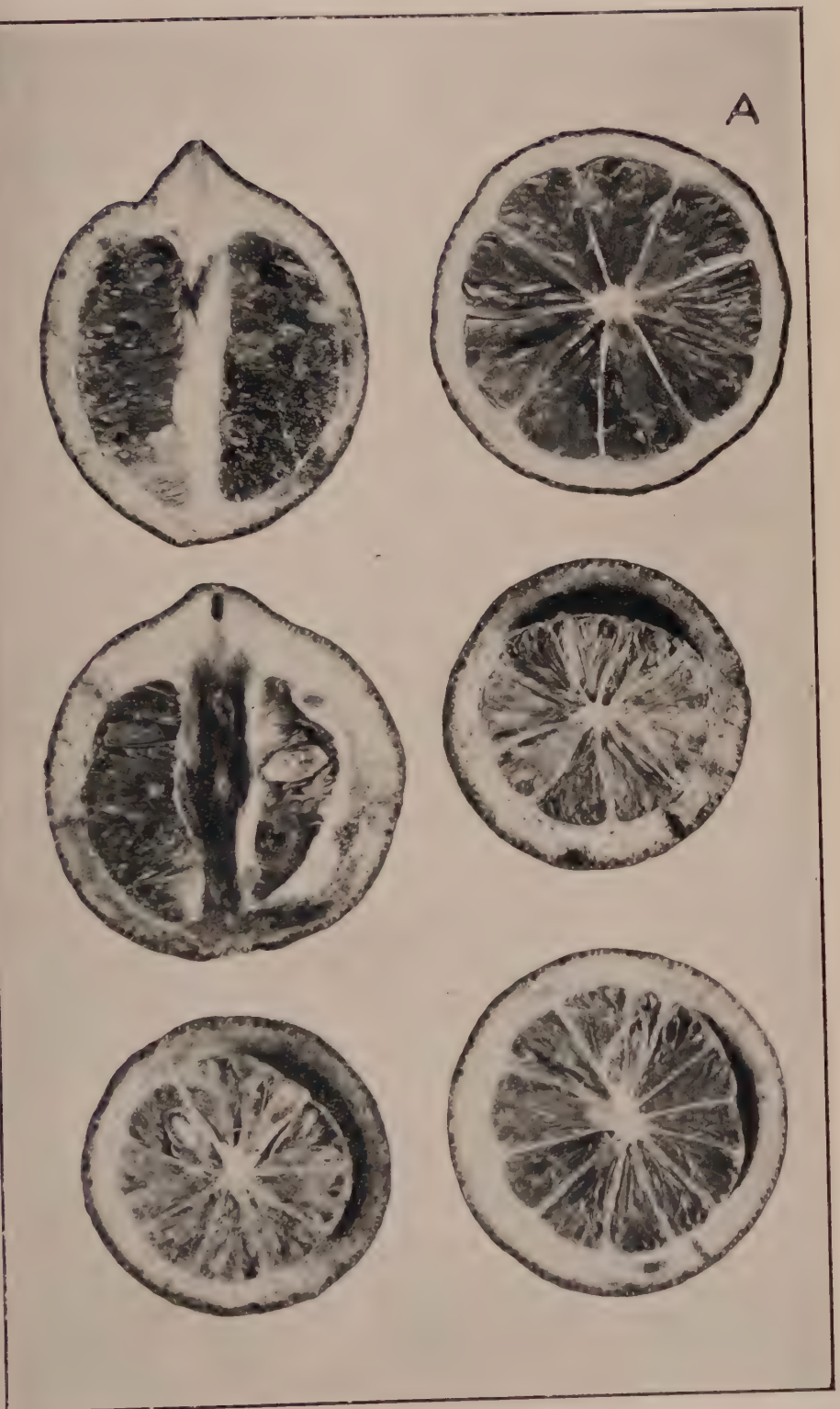

PLATE 54.—FIVE LEMONS AFFECTED WITH GUMMING DISEASE.
A—Healthy Lemon (Transverse Section.)

On the other hand, I understand that it is practically unknown to growers on the Blackall and at Buderim, where lemons do splendidly, and the soil is for the most part basaltic and of a heavy character.

It is, of course, impossible to report definitely with regard to effects produced by varying climatic and other influences, which may prove unfavourable to or tend to promote the occurrence of a disease of this kind, without first making an exhaustive study of such conditions; but, as the result of brief investigation, I am disposed to believe that unsuitability of climate may be primarily responsible, and that lemons planted in sheltered hot situations, on light badly-drained soils subjected to shallow cultivation, will be found to be more or less susceptible to this form of gumming disease.

Control Suggestions.

I am hardly justified at present in offering any decided recommendations with respect to the treatment of Mr. Horacek's trees, seeing that the subject under consideration requires much additional study from many standpoints.

A sample of his soil is being analysed by the Agricultural Chemist (Mr. J. C. Brünnich), and may yield valuable evidence.

In the meantime the bacillus observed by the Government Bacteriologist should be cultivated in some suitable medium, and a series of inoculation experiments conducted, for the purpose of determining whether it can be artificially transmitted.

It is highly important to settle this point, as, in the event of an affirmative result being obtained, it would be advisable to destroy all citraceous insect pests capable of conveying infection.

The more injurious of these are various large sap-sucking bugs which fly from tree to tree, and sometimes occasion serious losses by puncturing the fruit and tender foliage.

One of them, a big green species, known as the "Greater Horned Bug" (*Biporulus bibax*), occurred rather freely on these lemons, and, if able to carry this disease, its presence and activity during the hotter months might account for the percentage of diseased fruit being greater at that time of year than at any other season.

HIGH-PRICED BEEF.

Record prices, says the "Pastoral Review," for Queensland fat cattle were realised last month in Adelaide. Prime quality beef has mounted up gradually until it has now reached the high price of 45s. per 100 lb. Ten bullocks sent down from Cooper's Creek (Q.) made up to £19 2s. 6d. per head. A calf from the same station realised £8 7s. 6d. —the highest price ever paid for a calf in the Adelaide market.

Science.

THE PREVENTION OF MALARIA.

The following speech, descriptive of his fight against malaria on the rubber estates of the F.M.S., delivered by Mr. Malcolm Watson, appears in the "United Empire." After referring to the discovery that the mosquito was the carrier of many tropical diseases, Mr. Watson goes on to deal with his particular field of research, the malaria of the Selangor Coast. He says:—

"In studying this malaria, I found in a certain area there had been a steady rise from 1895 to 1899, and a fall from 1899 to 1902. The percentage of malaria treated at the hospital of the area had risen from 23 per cent. to 59 per cent., and then again fallen to 23 per cent. No one could account for either the rise or fall, but a study of official reports showed that the construction of a road parallel to the sea had interfered with drainage, and that the inauguration of a drainage scheme had been followed by improvement. This seemed a reasonable explanation, and I published an account of the observation. At this time there was considerable malaria at the Klang end of the road on the estates, and the planters complained that they could not drain their estates on account of the road. As a result of their representations, the Government voted 110,000 dollars for the Kapar drainage scheme, which provided for the drainage of 24,000 acres. From my point of view, this was an experiment on a large scale, and I did my best to profit by it. The first thing to be done was to get exact figures as to the amount of malaria present, and I accordingly made a series of blood examinations of children on the estates. A survey of the mosquitoes of the district was also made. To cut a long story short, it was found that malaria on the low alluvial coastal land was carried by a mosquito called *Anopheles umbrosus*, which breed in pools in the jungle; and that where the jungle was felled and the pools drained by open drainage, malaria completely disappeared, as shown by the health of the coolies improving, the admission to hospitals falling, the parasites disappearing from the blood of the children, and the percentage of children with enlarged spleens falling from 100 to 0. It was also shown that the percentage of children with enlarged spleens (called spleenrate) was in direct proportions to the proximity of their houses to the breeding-place of the mosquito—that is, the jungle pool.

"So we evolved a simple rule—that to avoid malaria on the low coastland we had only to house our coolies half a mile from the jungle. In some cases we moved coolies away from the jungle; in other cases, we removed the jungle from the coolies' houses. The results were absolutely certain. In fact health could be guaranteed, as has been demonstrated on many estates. To show how invariably this rule worked out I must give

you two instances which at first were puzzling. An old-established estate became unhealthy: within eighteen months its labour force had fallen from 600 to about 300; the daily sick in hospital rose from 2 or 3 to 70 to 100—with a similar number of milder cases of fever on the estate. The spleen-rate rose from 3 to 58. The death-rate rose from 10 to 80. The labour force was so reduced that the rubber trees could not be tapped and the manager was 30,000 lb. short of the estimate. I was quite at a loss to account for the outbreak. The manager assured me none of the coolie lines (or barracks) were within half a mile of the jungle, and I could find no breeding-place near to the lines within the estate. Ultimately, I decided to walk over the whole estate, and round its boundaries. It was only then I found that the estate boundaries did not run as I supposed, but bent so as to come close to two new lines which had been built eighteen months before.

"There had been a redistribution of coolies, so that all the coolies were mixed up, and then at first I was unable to locate the trouble. Needless to say, the new lines were abandoned, and within a short time improvement began, and there is every prospect of a return to health. The spleen-rate dropped within eight months from 58 to 17 per cent. That outbreak cost the estate £10,000 sterling. In the other case, a division of an estate became healthy; the spleen-rate dropped from 50 to 5. Yet jungle remained some 16 chains away as before. I was nonplussed at first, but said to the manager: 'Something has happened to the jungle; mosquitoes are not breeding in it.' Then he remembered that that very jungle had been drained by the neighbouring estate in connection with its water supply, but the trees had been left standing. Finally, thousands of acres have been opened on some estates with hardly a case of malaria, as the labour has always been kept at least half a mile from the jungle face being opened. Now the importance of all this is that what was always regarded as the great stronghold of malaria collapsed almost without a struggle. The low-lying clayland, with a high subsoil water, was supposed to be the home of malaria, yet, as I have shown, we have the situation absolutely in our hands.

"Again, the victory was as complete as our wildest hopes had dreamed. But just as our victory had been complete in the low flat land, we were at first as completely repulsed where we least expected it—namely, in the hill-land. We had always been taught that it was desirable to live on a hill if we wished to avoid malaria. Yet in the Federated Malay States, this is just the thing not to do in 999 cases out of 1,000. And the reason is that malaria in the hill-land is carried by a mosquito which breeds in hill-streams, and cannot be abolished by open drainage. Its name is *Anopheles maculatus*. When convinced this was so, we decided to put these streams underground for a certain distance round the habitations on the estates. The exact distance is probably about half a mile—as we found it necessary to house coolies that distance from jungle breeding-places on flat land. But in the interests of economy, I consider each estate should begin with a smaller area and work outwards. Estates were at once forthcoming with the money; Seafield, Glenmarie and North Hummock were the pioneers. The result was a complete

success on North Hummock, where the area to be done was small; while on the other two there has been a distinct improvement in health, but not as complete as we wish or intend to get.

"Then the Government drained an extensive area in the Federal capital, the result of which was excellent. In the words of the Principal Medical Officer's (Dr. Sansom) Annual Report:—'The results were immediate and completely satisfied the most sanguine anticipation. . . It may safely be claimed that general infection is now non-existent within the drained area.' This drained area was that occupied by the highest Government officials in the land and reserved for them. No fault could be found with their houses, food of the inhabitants, or general sanitary arrangements. Yet malaria had been an absolute scourge, sparing not even the highest. I have said enough to show that we are now on sound lines in dealing with malaria on hill land. Many details remain to be worked out, but we have already had enough success to encourage us to press on with the work."—"Rubber World."

THE ALGAROBA OR MESQUIT BEAN (*PROSOPIS JULIFLORA*).

Readers of this Journal may remember that in April, 1900, and also in April, 1901, Mr. G. B. Brooks, Instructor in Agriculture—then manager of the Kamerunga State Nursery—contributed two articles on this valuable tree to the Journals of those dates, to which we refer our readers. We have now received the following communication on the same subject from Mr. B. Harrison, Burringbar, New South Wales. Mr. Brooks was greatly impressed with the value of the bean as "a stock feed with a high fattening value. This value lies also in the pods being filled between the seeds with a sweet mealy substance which is very nutritious, and of which horses, cattle, and pigs are very fond, the Nursery stock bearing this out."

"This tree," says Mr. Harrison, "which is a native of Chile, South America, is a shady evergreen, much like our wattle, and grows from 30 to 40 ft. high. It yields two crops of beans annually, which make the finest food for horses, cattle, pigs, and poultry. In its native country immense quantities are gathered annually; and some years ago, on three estates alone, 15,000 bags were stored each year. The beans are encased in a small, thin, square covering inside the pod, which is very sweet and has a raisin-like flavour. By analysis they are exceedingly rich, and contain up to 28 per cent. of grape sugar, 17 of starch, and 11 of protein, and other nutritious ingredients. When crushed whole and mixed with hay or chaff, &c., they make a first-class fodder. The tree also yields a valuable gum, and the bark is used for tanning leather. The wood makes admirable furniture and fuel, and where timber is scarce the tree can be used both for shelter and line fences. This is one of the most valuable trees that farmers could plant, as it would furnish a supply of the richest fodder twice each year, and during the dry seasons, or periods of drought, when other kinds were not available, would prove of inestimable value."

General Notes.

HORSE WINCH.

The following particulars of the latest horse winch made by Trewhella Bros., Pty., Ltd., is published for the information of intending settlers on timbered lands:—

During the past few years more attention than formerly has been paid to preparing virgin land for agricultural purposes. This clearing means a large amount of hard work to the settler of new land, and to reduce labour costs to a minimum we have introduced a wire rope winch in which a horse does the work that was formerly done by manual labour. Having specialised in land-clearing implements for over twenty years, our latest horse winch embodies new features which tend to increase the strength, at the same time bringing about a reduction of the weight. This machine is manufactured under our own patents, the workmanship is first-class, and the materials used have proved (after numerous and severe tests) to be best suited for the purpose.

The frame of this machine is made of wrought material, and the gearing is all steel castings, the power being applied to the winding drum by two sets of gears, which in turn have the power applied by a horse wheel fitting on a pinion between the upper ends of the two larger gears. The central or floating pinion, as it is called, is not pivoted, and, therefore, where any irregularity occurs in the drum or pinion gearing, this floating pinion finds a centre between the gears, obviating the risk of breaking teeth through uneven bearing. The drum spindle is mounted at each end with eccentrics, allowing the drum to be thrown out of gear to facilitate uncoiling the drum rope preparatory to the next pull.

The horse pulls on a small rope having a turn round a grooved wheel on which a patent ball-bearing roller gripper is attached to press the rope into the groove and prevent slipping. At *each* end of the hub of the wheel is a clutch that fits a clutch either on the floating or main pinion. When in position, the horse pulls out the end of the rope until the other end is at the machine; then by turning the wheel over and pulling on the short end the strain is increased, and the stump or tree will be seen to gradually leave the ground. Two pulls on the slow gear are usually sufficient to displace the largest trees, and then the faster gear may be used. This method of applying the horse power to the machine enables the horse to pull in any direction that is open instead of continually crossing the ropes, as is usual with pulling machines.

We give a wide range of gears, the power of the horse being multiplied 16½, 33, 66, and 133 times; it will be seen that the machine is adapted to fast or slow pulling.

The snatch block for doubling the power of the machine is of the American lumberman's type, modified by us to suit the requirements of

a stump puller. It is light, quickly manipulated, built to stand the most severe strains, and removable when not in use. The sheave is of extra large size, and the rope is well guided in it.

The rope grab or shortener (for accompanying varying distances between trees and taking up slack rope) can be attached, and will hold the rope (without damage) at any point and in any position. It eliminates the use of short pull ropes or the winding of long lengths of rope on the drum.

For couplings we supply hooks and loops of our own design. They are quickly coupled, handier to attach, and, being fixtures, cannot be mislaid among leaves, grass, &c.

In case of breakages the band and wedge answer the same purpose as a splice, being secure, light, and cheaper.

All cables are of the highest grade steel wire. Unless otherwise specified, we supply galvanised for pull ropes and black for drum rope. The standard equipment (which will work a radius from an anchor of 160 ft. with snatch block and 180 ft. with single rope) is supplied unless otherwise specified.

EQUIPMENT, JANUARY, 1914.

Machine	£21	10	0
Sheave block	2	0	0
Grab	2	0	0
80′ 3½″ circ. galv. rope with hook, band, and wedge (pull)	4	5	0
40′ 3⅛″ circ. galv. rope with hook, band, and wedge (pull)	2	10	0
20′ 3⅛″ circ. galv. rope with 2 bands and wedges (anchor)	1	15	0
50′ 2½″ circ. blk. rope with ferrule, plug, hook, and wedge (drum)	2	10	0
100′ 1″ circ. galv. rope with thimbles and splices (horse)	1	1	0
	£37	11	0

Price complete, £37 10s.; weight complete, 8 cwt. 1 qr.

3⅛″ rope ord. lay, 11½d. per ft.; 2½″ rope langs lay, 7⅛d. per ft.

Rope, hook, and wedge, 10s.; band, 6s.; band wedge, 1s.; ferrule and plug, 2s. 6d.

THE INDESTRUCTIBLE TYRE.

Tyre inventions seem almost as numerous as tyre troubles; few of them in practice amount to much. If, however, a consensus of expert opinion in its favour does not mean that the Devereux indestructible tyre will enjoy better fortune, then we think we shall be a very long time before we materially improve on the present tube and tyre system. The idea of the indestructible tyre is one of sectional construction. In so many words, it is made in eight or nine sections, most ingeniously constructed; the worst puncture in any one section does not affect the

running of the wheel. The invention, it is claimed—and expert opinion endorses the claim—will save a vast amount of money now spent on repairs and spare tyres, and, more important still, it will prevent the fatal accidents so often directly due to tyre bursts. Mr. Edward Robert Devereux, the inventor, is a French engineer, and if, as we hope, the tyre does in daily work what it has never failed to do in the severe tests to which it has been put, Mr. Devereux will be a benefactor, not merely to the motorist but to the public. Assuming its success, we do not see how any other sort of tyre can continue to exist. Like most revolutionary inventions, it is so simple that everyone must wonder with M. Henri Didier that it was not thought of before. Incidentally, it may mean big things for the rubber business. Everyone will want an indestructible tyre, and the demand for rubber will be augumented many-fold.—"Rubber World."

REMARKABLE GROWTH OF PINEAPPLES.

The favourable season for pineapples has been productive of some remarkable results in the way of the production of several marketable fruits on one stalk. Here we have, not two, but thirteen good fruits on one stalk, which were produced at Gooburrum on Mr. L. Holcroft's farm. These cannot be called "freaks," such as often make their appearance in a pineapple plantation, and which are worth nothing from a commercial point of view. The pines here illustrated are saleable fruits, of which it was only possible to show eleven in the photograph.

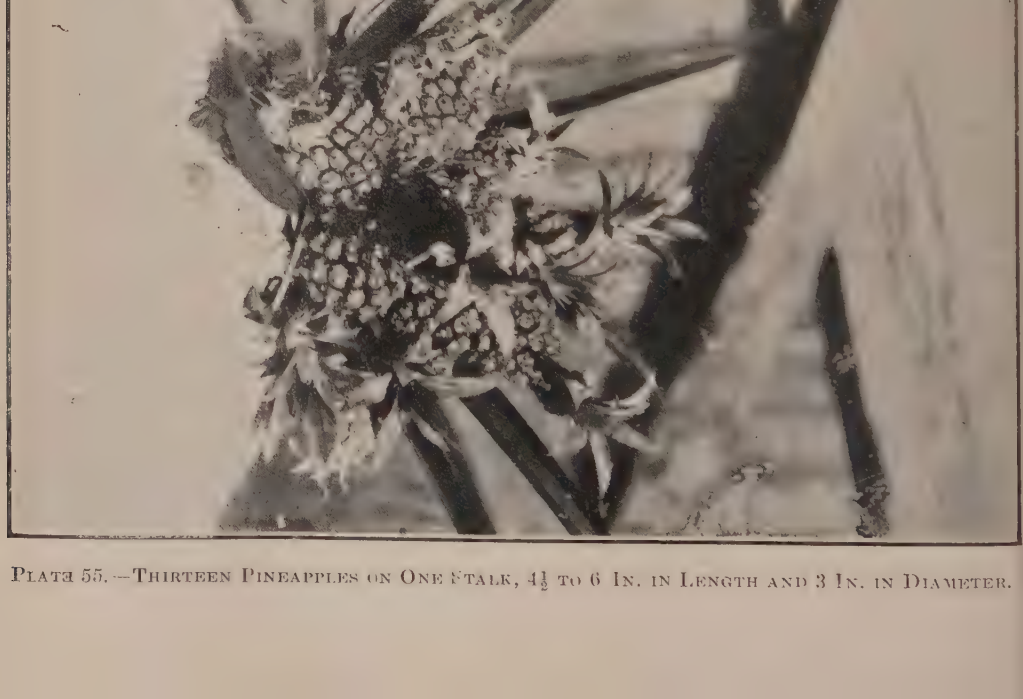

PLATE 55.—THIRTEEN PINEAPPLES ON ONE STALK, 4½ TO 6 IN. IN LENGTH AND 3 IN. IN DIAMETER.

COCONUTS, THE CONSOLS OF THE EAST.

In our February issue we mentioned that a second edition of Mr. Hamel Smith's book on "The Coconut" was issued last Christmas, the first edition having been rapidly exhausted. We have now received from Messrs. Angus and Robertson, Sydney, a copy of the new work, in the compilation of which Mr. F. A. G. Pape, F.R.G.S., F.R.H.S., &c., collaborated with Mr. Smith. The whole subject has, in this work, been so exhaustively treated that it might almost be affirmed that the last word on coconut cultivation in all parts of the tropical world has been said.

In the "Foreword" by Sir. Wm. Lever, Bart., that gentleman says:—"Strong as was the case for the profitable outlook of coconut planting when I wrote the "Foreword" to the first edition, it is stronger to-day. . . . I know of no field of Tropical Agriculture that is so promising at the present moment as coconut planting, and I do not think in the whole world there is a promise of so lucrative an investment of time and money as in this industry." And he goes on to point out that, "given reasonable precautions and care, there is very little risk of failure in coconut planting. Experience has greatly increased in the last ten years, with the result that the possibility of failure is reduced to a minimum. A large amount of capital is not required if the planter is willing to grow and cultivate annual crops during the period that his coconut plantation is coming into bearing." The amount of capital, he says, should not exceed £10 to £12 per acre, including every expense except the planter's own labour and interest on capital, and the net income of an acre of fully-bearing coconuts would be £10 per annum, so that a comparatively small plantation of a couple of hundred acres would yield a net income of £2,000. In this necessarily short review, it is impossible to comment upon the numerous sections of the work, which deal clearly and admirably with every phase of the industry, from the selection of a site to the clearing and preparation of the land, the importance of a careful selection of seed nuts, to the care and upkeep of the plantation. The diseases and pests of the coconut palm are exhaustively treated on. Several pages are devoted to the methods of cultivation in various countries, to the utilisation of the waste products, which Mr. H. D. Gibbs, in the "Philippine Journal of Science" (June, 1911), sets down at eighty-three. Copra and its preparation is exhaustively treated, some sixty pages being devoted to this, the most important of all the products of the coconut. In a word, we consider this second edition of Messrs. Smith and Pape's work should be in the hands of every planter or intending planter in all countries, and we especially advise the present planters and settlers in Northern Queensland, where coconut-growing is rapidly increasing, to secure a copy of a work which will not only be of infinite value to them at the start, but will enable them to profit by and avoid the mistakes of past years. The book may be procured from Messrs. Angus and Robertson, Limited, 89 Castlereagh st., Sydney: price, 12s. 6d., or 13s. 6d. post free.

Answers to Correspondents.

RIPE ROT DISEASE OF BANANAS.

F. WATTS, Kelsey Creek, Bowen—

The disease you mention as having attacked your bananas is known as the "ripe rot disease." The Jamaican bananas are not subject to it, but the Chinese varieties are very liable to be attacked. The Cavendish, however, appears to be less liable to the disease than others in this State. The best remedy is to destroy all fruit attacked and to handle the sound fruit very carefully, excluding all fingers marked with black patches, as the spores of the ripe rot fungus will settle on any bruised spot of the fruits and destroy them. You might try spraying with Bordeaux mixture to prevent the spread of the disease, but this will not save those already attacked. See "Queensland Agricultural Journal," vol. xxviii., page 285, April, 1912.

SAUERKRAUT AND CANNING VEGETABLES—PINEAPPLE WINE.

M. F. WATTS, Nudgee—

Mr. Charles Ross, F.R.H.S., Instructor in Fruit Culture, writes:—

The best work on the canning of cabbage and cauliflower is entitled "The Art of Canning and Preserving as an Industry," by Dr. Jean Pacrette, of Paris. It is necessary to carefully study the complete process if it is intended as a commercial commodity.

If preserved vegetables are required for home or local use only, any good recipe for making "sauerkraut" will be suitable. Most of our German neighbours are adepts in this connection.

For preparing, cooking (preserving), and canning, I recommend the following method, viz.:—The cabbage should be shredded as for ordinary pickling, and cauliflower, &c., cut into sections; place into a barrel, pressing each layer very firm. When the barrel is filled, cover with a board, heavily weighted. Between each layer sprinkle salt at the rate of 2½ lb. to every 100 lb. of vegetables. In a few days the liquor secreted will cover the whole mass, and constitute a pickle that will keep indefinitely. A few juniper berries should be added.

Before the above is cooked and canned, it should be washed in several waters, and then very slowly, but thoroughly, cooked in an enamel kettle with a close-fitting lid, with 2 to 3 oz. of goose fat or lard to the lb. and water up to the level of the sauerkraut. When cooked it must be moist, but not contain any water, and while still hot, just before canning, add 1 oz. of melted bacon per lb. and 1 pint of wine to every 10 lb. The whole is thoroughly mixed without breaking the fibres, and canned or bottled (leaving space for expansion), sealed down, and processed

as follows:—The receptacles are placed on wire trays and immersed in the coppers, and boiled from ¾ to 1¼ hours according to size of vessels. The longer the cooking and processing, the better will be the product.

P.S.—Dr. Jean Pacrette's book is published by Jules H. Dommergue, 40 Lembeck Avenue, Jersey City, New Jersey, U.S.A. A bookseller, if instructed, could probably obtain it for you.

A recipe for making pineapple wine is as follows:—

Over the peelings of 2 pineapples pour 1 quart of boiling water; allow it to steep until cold, then sweeten to taste, strain, and bottle. Tie down the cork, and place the bottle on its side; if placed in a warm place, it will be ripe in 24 hours. A small piece of ginger placed in each bottle will improve the flavour. If made in large quantities, the whole pineapple chopped should be used.

WATERPROOFING COATS, ETC.

"WATERPROOF," Nanango—

Dissolve ½ lb. shredded yellow soap in 1 quart of hot water. Then stir in 1 gallon of boiled linseed oil and 3 oz. of turps. Give the material two or three coats of this. Beeswax is not needed.

Another good method of waterproofing is with alumina soap. This consists in passing the article to be treated first through a warm soap bath (1 lb. to the gallon); then through an alum bath of the same strength, followed by passing the stuff through the mangle. There will be no appearance of any coating, as the alumina soap is in the fibre itself. This metallic soap is excellent for the purpose.

In the good old days of sailing vessels, sailors used to make their own oilskins and sou'-westers when they could get the necessary materials from the slop chest. The jacket and trousers are made of strong canvas, cut to shape. The canvas is then treated with a thin coat of boiled linseed oil, and hung up to dry. When perfectly dry, apply another coat of oil and let that dry. Two or three coats of oil will be needed, each being allowed to dry before the next application.

POISONING TREES.

"ANXIOUS SUBSCRIBER," Gympie—

See "Departmental Announcements" on page VII. of the Journal, Part 13.

SHEEP ON THE COAST.

In reply to a correspondent at Wondai, asking for conclusive and definite facts on the subject of breeding sheep on coast lands, Mr. W. G. Brown, Sheep and Wool Expert, says:—

"I think the ground was covered by my lecture. The chief thing necessary to the successful keeping of sheep on the coast is that salt and sulphate of iron be given the animals. Unlimited quantities. They will

not take more than they want. Conclusive and definite facts are as asked by your correspondent:—

"Worms may be eradicated—

1st. By burning off at a suitable time of year, and then sheep placed on the country whose worms have been expelled by suitable drenches.

By allowing paddocks to rest from sheep or cattle for not less than twelve months. Establish a rotation of paddocks, and in time worms will give little trouble. Advise your correspondent to get Dodd's Pamphlet on Wire Worms.

"I mentioned artificial grasses when I said emphatically that the natural grasses of the coast are quite unsuitable for sheep. Other than natural grasses are artificial—*i.e.*, cultivated.

"I shall go to Wondai as soon as these fly experiments are in full swing, and give practical demonstration."

In reply to another letter from Mr. P. W. Hart on the same subject, Mr. Brown says:—

1. Rhodes Grass is excellent sheep feed, especially if it is fed heavily. With a good stand it will run from 5 to 8 sheep per acre.
2. In the hot weather, sheep require a drink at least once in two days. In cold weather and on green grass, they may go without a drink for a week or more. I have seen sheep put in a dry paddock, and not watered for three weeks. The weather was cool, and there was abundance of green grass.
3. In a small flock 2 per cent. of rams is sufficient. In large paddocks 3 per cent. is usual.
4. I would advise for the coastal country Romney Marsh or Border Leicester rams.
5. A dog-proof fence is 3 ft. 6 in. rabbit netting, 6 in. in the ground, and, on top of that, 4 ft. marsupial netting, with a barbed wire at the junction of the netting. I would recommend, in the absence of netting, that all sheep should be yarded at night. Sheep get used to this, and come home at night regularly when once broken in. The dog-proof fence is expensive, but in the end will pay for itself. Bells should be placed round the necks of big, strong sheep. This will drive away dingoes and give an alarm to the owners of the sheep.

NOTE.—Mr. J. W. Matthews, sheep and wool expert of the N. S. Wales Department of Agriculture, writing on the same subject in "Dalgety's Review" (1st April), also recommends the Romney Marsh sheep for coast lands, but, as pure Romney ewes might prove in many cases too expensive, a good substitute would be a grade Romney. [Ed. "Q.A.J."]

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MARCH IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MARCH, 1913 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Mar.	No. of Years' Records.	Mar., 1914.	Mar., 1913.
North Coast.	In.		In.	In.
Atherton	9·02	11	13·10	17·87
Cairns	20·08	25	14·81	29·07
Cardwell	16·29	25	28·70	27·99
Cooktown	14·21	25	16·34	27·30
Herberton	8·73	25	14·01	10·57
Ingham	15·24	20	43·66	26 87
Innisfail	26 31	25	24·96	40·94
Mossman	25·26	5	32·31	27·03
Townsville	7·85	23	14·34	7·78
Central Coast.				
Ayr	7·69	25	11·24	14·19
Bowen	6·52	25	7·58	8·06
Charters Towers ...	3·95	25	4 09	4·68
Mackay	11·65	25	13·35	12·51
Proserpine	14·62	10	17·77	15·31
St. Lawrence ...	6·80	25	2·87	4 07
South Coast.				
Crohamhurst ...	13·62	20	16·92	3·98
Biggenden	4·89	14	11·09	1·34
Bundaberg	6·88	25	5·66	6·73
Brisbane	6·18	63	7·75	3·74
Childers	5 61	17	10·49	3·33
Esk	5·45	25	3·83	1·26
Gayndah	3·93	25	9·98	1·86
Gympie	7·46	25	9·73	1·37
Glasshouse M'tains	...	...	11·25	..
Kilkivan	4·94	25	8·93	1 07
Maryborough ...	7·21	25	12·74	1·73

Divisions and Stations	Average Rainfall.		Total Rainfall.	
	Mar.	No. of Years' Records.	Mar., 1914.	Mar., 1913.
South Coast—continued:	In.		In.	In.
Nanango	3·75	25	5·34	0·75
Rockhampton ...	5·51	25	5·53	5·50
Woodford	9·38	25	6·34	4·54
Yandina	9·19	19	14·06	4 02
Darling Downs.				
Dalby	3·72	22	3·55	2·75
Emu Vale	2·99	17	6·40	1·61
Jimbour	2·84	24	2·17	1·95
Miles	3·45	25	3·32	3·89
Stanthorpe ...	3·46	22	6·08	3·88
Toowoomba ...	4·64	22	4·28	1·73
Warwick	3·24	22	6·31	1·30
Maranoa.				
Roma	4 08	21	2·05	1·93
State Farms, &c.				
Gatton College ...	4·22	14	3·88	1·59
Gindie	3·06	13	3·00	1·08
Kamerunga Nurs'y	18·24	23	17·76	...
Kairi	...	...	11·46	.
Sugar Experiment Station, Mackay	13·53	16	12·49	.
Bungeworgorai ...	...	...	3·98	1·51
Warren	...	...	...	...
Hermitage ...	3·42	7	5·88	...

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for March this year and for the same period of 1913, having been compiled from telegraphic reports, are subject to revision.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR APRIL, 1914.

Article.		APRIL.
		Prices.
Bacon	lb.	7½d. to 9½d.
Bran	ton	£5 5s.
Butter	cwt.	100s.
Chaff, Mixed	ton	£3 15s. to £5 8s.
Chaff, Oaten (Victorian)	„	£5 10s. to £5 15s.
Chaff, Lucerne	„	£4 to £5 5s.
Chaff, Wheaten	„	£4 10s.
Cheese	lb.	7d. to 7½d.
Flour	ton	£9
Hams	lb.	1s. 2d.
Hay, Oaten (Victorian)	ton	£6 to £6 10s.
Hay, Lucerne (Prime)	„	£2 to £3 15s.
Honey	lb.	2d. to 3d.
Maize	bush.	4s. 7d. to 4s. 8d.
Oats	„	3s. 6d. to 3s. 10d.
Onions	ton	£9
Passion Fruit, per half-case	...	4s. to. 9s.
Pollard	ton	£5 15s.
Potatoes	„	£6 to £9 10s
Potatoes (Sweet)	cwt.	2s. 6d. to 3s. 6d.
Pumpkins	ton	£1 10s. to £2 5s.
Wheat, Milling	bush.	...
Eggs	doz.	1s. 1d. to 1s. 8d.
Fowls	pair	2s. 6d. to 4s. 9d.
Geese	„	5s. to 6s.
Ducks, English	„	2s. 6d. to 4s. 6d.
Ducks, Muscovy	„	2s. 9d. to 4s.
Turkeys (Hens)	„	5s. to 7s. 6d.
Turkeys (Gobblers)	„	9s. to 15s.

SOUTHERN FRUIT MARKETS.

Article.	APRIL.
	Prices.
Bananas (Fiji), G.M., per case	17s. to 18s.
Bananas (Fiji), G.M. per bunch	4s. to 12s.
Bananas (Queensland), per case	...
Bananas (Queensland), per bunch	6s. to 12s.
Mandarins (Emperors), per case	10s. to 12s.
Oranges (Navel), per case	8s. to 12s.
Oranges (other), (Queensland), per case	5s. to 8s.
Pawpaw Apples, per quarter-case	...
Passion Fruit, per half-case	9s.
Pineapples (Queensland), (common), per case	6s. to 10s.
Pineapples (Queensland), (Ripleys), per case	6s. to 10s.
Pineapples (Queensland), (Queens), per double case	8s. to 9s.
Pineapples (Rough), per case	7s. to 8s.
Strawberries	...
Tomatoes, per quarter-case	1s. 6d. to 3s. 6d.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	APRIL Prices.
Apples, Eating (American), per case	5s. 6d. to 7s 6d.
Apples (Cooking), per case	5s. 6d. to 7s. 6d.
Apricots, per quarter-case	...
Bananas (Cavendish), per dozen	2d. to 3½d.
Bananas (Sugar), per dozen	2¾d. to 3¾d.
Cape Gooseberries, per quarter-case	6s. to 7s.
Cherries, per quarter-case	...
Citrons, per cwt.	...
Cocoanuts, per sack	13s. to 14s.
Custard Apples, per quarter-case	4s. 6d. to 6s.
Lemons (Local), per quarter-case	12s. to 14s. 3d.
Lemons (Italian), 160 Fruits, per case	20s.
Limes, per case	..
Mandarins, per case	6s. to 8s.
Mangoes, per case	...
Oranges (Italian), per case	17s. to 18s. 6d.
Oranges (Other), per case	7s. to 10s.
Papaw Apples, per quarter-case	2s. to 3s.
Passion Fruit, per quarter-case	5s.
Peaches, per quarter-case	...
Persimmons, per quarter-case	1s. 6d. to 3s.
Pears, per half-bushel case	5s. 6d. to 6s.
Peanuts, per pound	3d. to 3½d.
Pineapples (Ripley), per dozen	5s. to 8s.
Pineapples (Rough), per dozen	2s. to 5s.
Pineapples (Smooth), per dozen	1s. 6d. to 4s.
Plums, per quarter-case	...
Rockmelons, per dozen	
Strawberries	...
Tomatoes, per quarter-case	1s. to 3s. 6d.
Watermelons, per dozen	...

TOP PRICES, ENOGGERA YARDS, MARCH, 1914.

Animal.	MARCH. Prices.
Bullocks	£8 to £10 12s. 6d.
Bullocks (Single)	...
Cows	£7 to £9 5s.
Merino Wethers	25s.
Crossbred Wethers	26s. 6d.
Comeback Wethers	28s. 6d.
Merino Ewes	17s. 6d.
Crossbred Ewes	25s
Shropshire Ewes	23s.
Lambs	20s.
Pigs (Porkers)	39s. 6d.

Farm and Garden Notes for June.

FIELD.—Winter begins on the 24th of this month, and frosts will already have been experienced in some of the more exposed districts of the Southern coast and on the Darling Downs. Hence insect pests will, to a great extent, cease from troubling, and weeds will also be no serious drawback to cultivation. The month of June is considered by the most successful lucerne-growers to be the best time to lay down this crop, as any weeds which may spring up in the event of a dropping season will be so slow-growing that the young lucerne plants will not be choked by them.

The land should now be got ready for millets, sorghums, panicum, &c. Oats, barley, vetches, clover, tobacco, buckwheat, field carrots, and Swedes may now be sown. Some advocate the sowing of early maize and potatoes during this month, but obviously this can only apply to the more tropical parts of Queensland. The land may be got ready, but in the Southern districts and on the tableland neither maize nor potatoes should be planted before August, or at the earliest, in warm early districts, at the end of July. There is always almost a certainty of frosts, more or less severe, during these months. Arrowroot will be nearly ready for digging, but we would not advise taking up the bulbs until the frosts of July have occurred. Take up sweet potatoes, yams, and ginger. Should there be a heavy crop, and consequently a glut in the market, sweet potatoes may be kept by storing them in a cool place in dry sand, taking care that they are thoroughly ripe before digging. The ripeness may be known by the milky juice of a broken tuber remaining white when dry. Should the juice turn dark, the potato is unripe, and will rot or dry up and shrivel in the sand pit. Before pitting, spread the tubers out in a dry barn or in the open, if the weather be fine. In pitting them or storing them in hills, lay them on a thick layer of sand; then pour dry sand over them till all the crevices are filled and a layer of sand is formed above them; then put down another layer of tubers, and repeat the process until the hill is of the requisite size. The sand excludes the air, and the potatoes will keep right through the Winter. Late wheat may still be sown, but it is too late for a field crop of onions. In tropical Queensland the bulk of the coffee crop should be off by the end of July. Yams may be unearthed. Cuttings of cinnamon and kola-nut tree may be made, the cuttings being planted under bell glasses. Collect divi-divi pods and tobacco leaves. English potatoes may be planted. The opium poppy will now be blooming and forming capsules. Gather tilseed (sesame), and plant out young tobacco plants if the weather be suitable. Sugar-cane cutting may be commenced. Keep the cultivator moving amongst the pineapples. Gather all ripe bananas. Fibre may be produced from the old stems.

KITCHEN GARDEN.—Cabbage, cauliflower, and lettuce may be planted out as they become large enough. Plant asparagus and rhubarb in well-prepared beds in rows. In planting rhubarb it will probably be found more profitable to buy the crowns than to grow them from seed, and the same remark applies to asparagus.

Sow cabbage, red cabbage, peas, lettuce, broad beans, carrots, radish, turnip, beet, leeks, and herbs of various kinds, such as sage, thyme, mint, &c. Eschalots, if ready, may be transplanted; also, horse-radish can be set out now.

The earlier sowings of all root crops should now be ready to thin out, if this has not been already attended to.

Keep down the weeds among the growing crops by a free use of the hoe and cultivator.

The weather is generally dry at this time of the year, so the more thorough the cultivation the better for the crops.

Land for early potatoes should now be got ready by well digging or ploughing.

Tomatoes intended to be planted out when the weather gets warmer may be sown towards the end of the month in a frame where the young plants will be protected from frost.

FLOWER GARDEN.—No time is now to be lost, for many kinds of plants need to be planted out early to have the opportunity of rooting and gathering strength in the cool moist Spring time to prepare them for the trial of heat they must endure later on. Do not put your labour on poor soil. Raise only the best varieties of plants in the garden; it costs no more to raise good varieties than poor ones. Prune closely all the hybrid perpetual roses; and tie up, without pruning, to trellis or stakes the climbing and tea-scented varieties, if not already done. These and other shrubs may still be planted. See where a new tree or shrub can be planted; get these in position; then they will give you abundance of spring bloom. Renovate and make lawns, and plant all kinds of edging. Finish all pruning. Divide the roots of chrysanthemums, perennial phlox, and all other hardy clumps; and cuttings of all the Summer bedding plants may be propagated.

Sow first lot, in small quantities, of hardy and half-hardy annuals, biennials, and perennials, some of which are better raised in boxes and transplanted into the open ground, but many of this class can, however, be successfully raised in the open if the weather is favourable. Antirrhinum, carnation, picotees, dianthus, hollyhock, larkspur, pansy, petunia, *Phlox Drummondii*, stocks, wallflower, and zinnias, &c., may be sown either in boxes or open beds; mignonette is best sown where it is intended to remain.

To grow these plants successfully, it is only necessary to thoroughly dig the ground over to a depth of not less than 12 in., and incorporate with it a good dressing of well-decayed manure, which is most effectively done by a second digging; the surface should then be raked over smoothly,

so as to remove all stones and clods, thus reducing it to a fine tilth. The seed can then be sown in lines or patches as desired, the greatest care being taken not to cover deeply; a covering of not more than three times the diameter of larger seeds, and a light sprinkling of fine soil over small seeds, being all that is necessary. A slight mulching of well-decayed manure and a watering with a fine-rosed can will complete the operation. If the weather prove favourable, the young seedlings will usually make their appearance in a week or ten days; thin out so as to leave each plant (if in the border) at least 4 to 6 in. apart.

Orchard Notes for June.

THE SOUTHERN COAST DISTRICTS.

The Notes of last month, referring to the care to be taken in the handling and marketing of all kinds of citrus fruits, apply with equal force during this and subsequent months till the end of the season.

Keep the orchard clean, and work the land to retain moisture. The handling of the citrus crop is the main work in many orchards, but where slowly acting manures are to be given their application should not be later than this month. They should be well mixed with the soil, so that when the Spring comes and the trees start a fresh growth a certain percentage of plant food will be available for the trees' use. Heavy pruning should be done now, whilst the trees are dormant. All large limbs should be cut off close to the main stem; the edges of the cuts should be carefully trimmed, and the whole wound, if of large size, covered with paint or grafting wax, so that it will not start to decay but soon grow over. When the soil of the orchard is becoming deficient in organic matter, the growing of a Winter green crop, such as mustard or rape, is well worth a trial. Clear the crop of fruit from the part of the orchard to be so treated. Plough the land well; work the soil down fine so as to get a good seed bed, and broadcast the mustard or rape. A manuring of 4 cwt. of meatworks manure and 1 cwt. of sulphate of potash per acre will produce a very heavy crop of green manure, and the plant food not required for the production of such crop will be still available for the trees' use in Spring.

Pineapples and bananas should all be cleaned up, and the land got into first-class order. Pineapples, where at all liable to frost, should be covered with grass or other suitable material. The growth of weeds between the rows of pines on land liable to frost is one of the best ways of encouraging frost, as frost will strike dirty, weedy ground, and injure the pines growing thereon severely, when it will do little, if any, damage where the land is kept perfectly clean—another advantage of cleanliness in cultivation.

THE TROPICAL COAST DISTRICTS.

Keep the land well cultivated—plough when necessary to bury weed growth, and get the surface of the ground into a state of thorough tilth, as moisture must be retained in the soil by cultivation to mature the Spring crop of fruit. This applies not only to oranges and other tree fruits, but to bananas and pines as well. A good start in Spring means good bunches of bananas and early-ripening pineapples. Heavy pruning can be done now in the case of all trees not carrying a heavy crop of fruit; but where citrus trees are heavily loaded, the pruning should be put off till after the Spring crop of fruit has been gathered. The spraying of the trunks and inside of the trees with the lime and sulphur wash can be carried out, and where Maori is making its appearance the sulphide of soda wash should be used as well.

THE SOUTHERN AND CENTRAL TABLELANDS.

The pruning of all kinds of deciduous fruit trees is the chief work of the month in the Stanthorpe district. Do not be frightened to prune severely—first, in the case of young trees, so as to get strong well-grown trees instead of straggling top-heavy trees; and, second, in the case of trees that are going off in the size and quality of their fruit. Where peaches, apricots, plums, or nectarines are only making very little growth, and that weak, so that the fruit produced thereon is small, it is advisable to head the tree hard back, so that it will throw out some vigorous branches in Spring that will form a new head for the tree. Apples, as well as plums and apricots, are sometimes inclined to overproduce fruit spurs, which become long and straggling, and bear a large quantity of small-size fruit. A vigorous shortening back and cutting out of such spurs will have a very beneficial effect in the quality and size of the fruit produced.

Gather and burn all prunings; and where codlin moth is present in the orchard, examine the tree carefully when pruning it, so as to see if there are any cracks, crevices, or masses of loose bark in or under which the larvæ of the moth may be hibernating. All larvæ so found should be destroyed, and if the work is carried out systematically it will tend to materially decrease the crop of moths that will hatch out the following Spring.

As soon as any part of the orchard is pruned, gather up the prunings and work the land, as a thorough winter weathering of the soil is very beneficial in its effects; and, further, it will tend to destroy many insects that may be wintering in it. The planting of new orchards or of trees to replace any that may have died, or that have been proved to be unsuitable to the district, may be continued during the month, and right on till the end of Winter.

Do not prune vines in the Stanthorpe district, as it is advisable to leave the pruning as late as possible, but vine-pruning can be done at any time now in the Roma or Central districts. Tree-pruning can be continued during the month, and the orchard should be kept well worked. Citrus fruits can be marketed. Lemons should be gathered and cured.